

Bellrock Offshore Wind Farm

Wind Farm Development Area

Report to Inform Appropriate Assessment - Volume VI

Part 3: Special Protection Area and Ramsar Assessments: Ornithology

Date: April 2026

Document Number: RHDV_BEL_CST_REP_0021

Revision Number: 1

Classification: Public

Revision History

Rev.	Prepared By	Checked By	Approved By	Date
1	Haskoning	SA	BMcG	01/04/2026

This page is intentionally blank

Contents

1	Introduction and Consultation	1
2	Summary and Update of HRA Screening Conclusions	31
2.1	Summary of the HRA Screening Report Conclusions	31
2.2	Updates and Revision to the HRA Screening Conclusions	32
2.2.1	Changes Following Incorporation of the Second Year of the Baseline DAS Data	32
2.3	Conclusions on the Potential for Likely Significant Effects	35
3	Information to Inform Appropriate Assessment.....	73
3.1	Realistic Worst-case Scenario	73
3.2	Baseline Information	83
3.3	Conservation Objectives and Conservation Advice	83
3.4	Approach to the In-combination Assessments.....	84
4	Assessment of Potential Adverse Effects on Integrity	88
4.1	Relevant Impact Pathways and Methods of Assessment	88
4.1.1	Construction and Decommissioning	88
4.1.2	Operation and Maintenance	90
4.2	Matters Relevant to the Interpretation of the Assessment Conclusions	92
4.2.1	Implications of the Outbreak of Highly Pathogenic Avian Influenza	92
4.2.2	Precautionary Assumptions in the Assessments of Breeding Seabird Colony SPAs	96
4.3	Assessment of Potential Adverse Effects on Integrity: Marine SPAs	99
4.3.1	Outer Firth of Forth and St Andrew's Bay Complex SPA	99
4.3.2	Moray Firth SPA.....	105
4.3.3	Scapa Flow SPA.....	110
4.4	Assessment of Potential Adverse Effects on Site Integrity: Breeding Seabird Colony SPAs.....	114
4.4.1	Buchan Ness to Collieston Coast SPA	114
4.4.2	Fowlsheugh SPA	138
4.4.3	St Abb's Head to Fast Castle SPA	168
4.4.4	Farne Islands SPA.....	185
4.4.5	Forth Islands SPA.....	212
4.4.6	Troup, Pennan and Lion's Heads SPA	265
4.4.7	Coquet Island SPA	291
4.4.8	East Caithness Cliffs SPA	301
4.4.9	North Caithness Cliffs SPA.....	327
4.4.10	Copinsay SPA.....	360
4.4.11	Flamborough and Filey Coast SPA	377
4.4.12	Hoy SPA	418
4.4.13	Fair Isle SPA.....	435
4.4.14	Calf of Eday SPA	465
4.4.15	West Westray SPA	467
4.4.16	Sule Skerry and Sule Stack SPA.....	483

4.4.17	Noss SPA.....	500
4.4.18	North Rona and Sula Sgeir SPA.....	515
4.4.19	Hermaness, Saxa Vord and Valla Field SPA	532
4.4.20	St Kilda SPA	548
4.4.21	Mingulay and Berneray SPA.....	560
4.4.22	Rathlin Island SPA.....	571
4.5	Assessment of Potential Adverse Effect on Site Integrity: Migratory Non-Seabird SPAs	581
4.5.1	The SPAs and Pathways to Effect.....	581
4.5.2	Approach to Collision Risk Assessment	582
4.5.3	Assessment of Collision Effects.....	583
4.5.4	Barrier Effect Assessment	590
5	Conclusion	591
6	References.....	598

List of Appendices

Appendix A: European Site Information and Conservation Objectives: Migratory non-seabird SPAs

Appendix B: In-combination Assessment Update

List of Tables

Table 1.1:	Consultation Relevant to Offshore Ornithology Habitats Regulations Appraisal	3
Table 2.1:	Summary of European Sites and Relevant Qualifying Features for Which Potential LSEs have been Identified and Screened in for Further Assessment in the RIAA	37
Table 3.1:	Overview of Realistic Worst-Case Design Scenario	75
Table 4.1:	Details on the Qualifying Features of the Outer Firth of Forth and St Andrews Bay Complex SPA	100
Table 4.2:	Details on the Qualifying Features of the Moray Firth SPA	106
Table 4.3:	Details on the Qualifying Features of the Scapa Flow SPA.....	111
Table 4.4:	Details on the Qualifying Features of the Buchan Ness to Collieston Coast SPA.....	115
Table 4.5:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Buchan Ness to Collieston Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate	123
Table 4.6:	Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	123
Table 4.7:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Buchan Ness to Collieston Coast SPA Kittiwake Population	125
Table 4.8:	Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	129
Table 4.9:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	130
Table 4.10:	Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects	132
Table 4.11:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	133
Table 4.12:	Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	134
Table 4.13:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	136
Table 4.14:	Details on the Qualifying Features of the Fowlsheugh SPA	139
Table 4.15:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fowlsheugh SPA and Age Class Apportionment Estimates and Sabbatical Rate	143
Table 4.16:	Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	143
Table 4.17:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fowlsheugh SPA Kittiwake Population.....	145
Table 4.18:	Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	147

Table 4.19:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	148
Table 4.20:	Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects	149
Table 4.21:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	150
Table 4.22:	Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	151
Table 4.23:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	153
Table 4.24:	Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fowlsheugh SPA and Age Class Apportionment Estimates and Sabbatical Rate	160
Table 4.25:	Potential Annual Mortality of Fowlsheugh SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	161
Table 4.26:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure	162
Table 4.27:	Potential Annual Mortality of Fowlsheugh SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	165
Table 4.28:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	166
Table 4.29:	Details on the Qualifying Features of the St Abb's Head to Fast Castle SPA	169
Table 4.30:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the St Abb's Head and to Fast Castle SPA and Age Class Apportionment Estimates and Sabbatical Rate	173
Table 4.31:	Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	174
Table 4.32:	Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the St Abb's Head to Fast Castle SPA Kittiwake Population	175
Table 4.33:	Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	177
Table 4.34:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	178
Table 4.35:	Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	180
Table 4.36:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	181

Table 4.37:	Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	182
Table 4.38:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	183
Table 4.39:	Details on the Qualifying Features of the Farne Islands SPA.....	186
Table 4.40:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Farne Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	189
Table 4.41:	Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	190
Table 4.42:	Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Farne Islands SPA Kittiwake Population	191
Table 4.43:	Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	194
Table 4.44:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	195
Table 4.45:	Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects..	196
Table 4.46:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	197
Table 4.47:	Potential Annual Mortality of Farne Islands SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	198
Table 4.48:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	199
Table 4.49:	Puffin Mean Peak Abundance Estimate for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Farne Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	205
Table 4.50:	Potential Annual Mortality of Farne Islands SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer	206
Table 4.51:	Potential Annual Mortality of Farne Islands SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	209
Table 4.52:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	210
Table 4.53:	Details on the Qualifying Features of the Forth Islands SPA.....	213
Table 4.54:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	217
Table 4.55:	Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	217

Table 4.56:	Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Forth Islands SPA Kittiwake Population	219
Table 4.57:	Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	221
Table 4.58:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	222
Table 4.59:	Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects ..	223
Table 4.60:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	224
Table 4.61:	Potential Annual Mortality of Forth Islands SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	225
Table 4.62:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	226
Table 4.63:	Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	230
Table 4.64:	Potential Annual Mortality of Forth Islands SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	231
Table 4.65:	Potential Annual Mortality of Forth Islands SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	233
Table 4.66:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	234
Table 4.67:	Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	239
Table 4.68:	Potential Annual Mortality of Forth Islands SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer	240
Table 4.69:	Potential Annual Mortality of Forth Islands SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	243
Table 4.70:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	244
Table 4.71:	Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate	251
Table 4.72:	Potential Annual Mortality of Forth Islands SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	251
Table 4.73:	Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Forth Islands SPA Gannet Population	253

Table 4.74:	Potential Annual Mortality of Forth Islands SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	256
Table 4.75:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	257
Table 4.76:	Potential Annual Mortality of Forth Islands SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects..	258
Table 4.77:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	259
Table 4.78:	Potential Annual Mortality of Forth Islands SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	260
Table 4.79:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	262
Table 4.80:	Details on the Qualifying Features of the Troup, Pennan and Lion's Heads SPA	265
Table 4.81:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Troup, Pennan and Lion's Heads SPA and Age Class Apportionment Estimates and Sabbatical Rate	270
Table 4.82:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	270
Table 4.83:	Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Troup, Pennan and Lion's Heads SPA Kittiwake Population	272
Table 4.84:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-combination with the Potential Displacement Mortality from Other Plans and Projects	274
Table 4.85:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	275
Table 4.86:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	277
Table 4.87:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	278
Table 4.88:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	279
Table 4.89:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	280
Table 4.90:	Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Troup, Pennan and Lion's Heads SPA and Age Class Apportionment Estimates and Sabbatical Rate	284
Table 4.91:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	284

Table 4.92:	Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	287
Table 4.93:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	288
Table 4.94:	Details on the Qualifying Features of the Coquet Island SPA	292
Table 4.95:	Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Coquet Island SPA and Age Class Apportionment Estimates and Sabbatical Rate	295
Table 4.96:	Potential Annual Mortality of Coquet Island SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer	296
Table 4.97:	Potential Annual Mortality of Coquet Island SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	298
Table 4.98:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Coquet Island SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	299
Table 4.99:	Details on the Qualifying Features of the East Caithness Cliffs SPA	302
Table 4.100:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the East Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate	305
Table 4.101:	Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	306
Table 4.102:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the East Caithness Cliffs SPA Kittiwake Population	307
Table 4.103:	Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	310
Table 4.104:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	311
Table 4.105:	Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	312
Table 4.106:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	313
Table 4.107:	Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	314
Table 4.108:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	316
Table 4.109:	Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the East Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate	319

Table 4.110: Potential Annual Mortality of East Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	320
Table 4.111: Potential Annual Mortality of East Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	323
Table 4.112: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	324
Table 4.113: Details on the Qualifying Features of the North Caithness Cliffs SPA	329
Table 4.114: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate	332
Table 4.115: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	332
Table 4.116: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the North Caithness Cliffs SPA Kittiwake Population	334
Table 4.117: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	336
Table 4.118: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	337
Table 4.119: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	339
Table 4.120: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	340
Table 4.121: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	341
Table 4.122: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	342
Table 4.123: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate	346
Table 4.124: Potential Annual Mortality of North Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	346
Table 4.125: Potential Annual Mortality of North Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	349
Table 4.126: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	350
Table 4.127: Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate	354

Table 4.128: Potential Annual Mortality of North Caithness Cliffs SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer	354
Table 4.129: Potential Annual Mortality of North Caithness Cliffs SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	357
Table 4.130: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	358
Table 4.131: Details on the Qualifying Features of the Copinsay SPA	361
Table 4.132: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Copinsay SPA and Age Class Apportionment Estimates and Sabbatical Rate	364
Table 4.133: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	365
Table 4.134: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Copinsay SPA Kittiwake Population	366
Table 4.135: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	369
Table 4.136: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	370
Table 4.137: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects	371
Table 4.138: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	372
Table 4.139: Potential Annual Mortality of Copinsay SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	373
Table 4.140: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	374
Table 4.141: Details on the Qualifying Features of the Flamborough and Filey Coast SPA	378
Table 4.142: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate	382
Table 4.143: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	382
Table 4.144: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Flamborough and Filey Coast SPA Kittiwake Population.....	384
Table 4.145: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	386
Table 4.146: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	387

Table 4.147: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	389
Table 4.148: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	390
Table 4.149: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	391
Table 4.150: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	392
Table 4.151: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate	396
Table 4.152: Potential Annual Mortality of Flamborough and Filey Coast SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	396
Table 4.153: Potential Annual Mortality of Flamborough and Filey Coast SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	399
Table 4.154: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	400
Table 4.155: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate	405
Table 4.156: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	406
Table 4.157: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Flamborough and Filey Coast SPA Gannet Population	407
Table 4.158: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	409
Table 4.159: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	411
Table 4.160: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	412
Table 4.161: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	413
Table 4.162: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	415
Table 4.163: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	416

Table 4.164: Details on the Qualifying Features of the Hoy SPA	420
Table 4.165: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Hoy SPA and Age Class Apportionment Estimates and Sabbatical Rate.....	423
Table 4.166: Potential Annual Mortality of Hoy SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	423
Table 4.167: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Hoy SPA Kittiwake Population.....	425
Table 4.168: Potential Annual Mortality of Hoy SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	427
Table 4.169: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	428
Table 4.170: Potential Annual Mortality of Hoy SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	430
Table 4.171: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	431
Table 4.172: Potential Annual Mortality of Hoy SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	432
Table 4.173: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	433
Table 4.174: Details on the Qualifying Features of the Fair Isle SPA.....	436
Table 4.175: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fair Isle SPA and Age Class Apportionment Estimates and Sabbatical Rate.....	439
Table 4.176: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	440
Table 4.177: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fair Isle SPA Kittiwake Population	441
Table 4.178: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	443
Table 4.179: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	444
Table 4.180: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	446
Table 4.181: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	447
Table 4.182: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	448

Table 4.183:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	449
Table 4.184:	Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fair Isle SPA and Age Class Apportionment Estimates and Sabbatical Rate	453
Table 4.185:	Potential Annual Mortality of Fair Isle SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	453
Table 4.186:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fair Isle SPA Gannet Population	455
Table 4.187:	Potential Annual Mortality of Fair Isle SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	457
Table 4.188:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	458
Table 4.189:	Potential Annual Mortality of Fair Isle SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	460
Table 4.190:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	461
Table 4.191:	Potential Annual Mortality of Fair Isle SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	462
Table 4.192:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	463
Table 4.193:	Details on the Qualifying Features of the Calf of Eday SPA	466
Table 4.194:	Details on the Qualifying Features of the West Westray SPA	468
Table 4.195:	Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the West Westray SPA and Age Class Apportionment Estimates and Sabbatical Rate	471
Table 4.196:	Potential Annual Mortality of West Westray SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer	471
Table 4.197:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the West Westray SPA Kittiwake Population	473
Table 4.198:	Potential Annual Mortality of West Westray SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	475
Table 4.199:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	476
Table 4.200:	Potential Annual Mortality of West Westray SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects ..	478
Table 4.201:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	479

Table 4.202: Potential Annual Mortality of West Westray SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	480
Table 4.203: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects ...	481
Table 4.204: Details on the Qualifying Features of the Sule Skerry and Sule Stack SPA	484
Table 4.205: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Sule Skerry and Sule Stack SPA and Age Class Apportionment Estimates and Sabbatical Rate	487
Table 4.206: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	488
Table 4.207: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Sule Skerry and Sule Stack SPA Gannet Population.....	489
Table 4.208: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	492
Table 4.209: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	493
Table 4.210: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	494
Table 4.211: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	495
Table 4.212: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	496
Table 4.213: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	498
Table 4.214: Details on the Qualifying Features of the Noss SPA	500
Table 4.215: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Noss SPA and Age Class Apportionment Estimates and Sabbatical Rate.....	504
Table 4.216: Potential Annual Mortality of Noss SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	504
Table 4.217: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Noss SPA Gannet Population	505
Table 4.218: Potential Annual Mortality of Noss SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	508
Table 4.219: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects	509
Table 4.220: Potential Annual Mortality of Noss SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	510

Table 4.221:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	511
Table 4.222:	Potential Annual Mortality of Noss SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	512
Table 4.223:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	514
Table 4.224:	Details on the Qualifying Features of the North Rona and Sula Sgeir SPA	517
Table 4.225:	Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Rona and Sula Sgeir SPA and Age Class Apportionment Estimates and Sabbatical Rate	520
Table 4.226:	Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	521
Table 4.227:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the North Rona and Sula Sgeir SPA Gannet Population	522
Table 4.228:	Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	525
Table 4.229:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Rona and Sula Sgeir SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects	526
Table 4.230:	Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	527
Table 4.231:	Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	529
Table 4.232:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Rona and Sula Sgeir SPA Gannet Population due to the Potential Combined Collision and Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects	530
Table 4.233:	Details on the Qualifying Features of the Hermaness, Saxa Vord and Valla Field SPA	533
Table 4.234:	Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Hermaness, Saxa Vord and Valla Field SPA and Age Class Apportionment Estimates and Sabbatical Rate	536
Table 4.235:	Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	536
Table 4.236:	Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Hermaness, Saxa Vord and Valla Field SPA Gannet Population	538
Table 4.237:	Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	540
Table 4.238:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	541

Table 4.239: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects	542
Table 4.240: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	543
Table 4.241: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	545
Table 4.242: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	546
Table 4.243: Details on the Qualifying Features of the St Kilda SPA	549
Table 4.244: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the St Kilda SPA and Age Class Apportionment Estimates and Sabbatical Rate	552
Table 4.245: Potential Annual Mortality of St Kilda SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer	553
Table 4.246: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the St Kilda SPA Gannet Population	554
Table 4.247: Potential Annual Mortality of St Kilda SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	556
Table 4.248: Potential Annual Mortality of St Kilda SPA Gannets due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects	558
Table 4.249: Potential Annual Mortality of St Kilda SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	559
Table 4.250: Details on the Qualifying Features of the Mingulay and Berneray SPA	562
Table 4.251: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Mingulay and Berneray SPA and Age Class Apportionment Estimates and Sabbatical Rate	564
Table 4.252: Potential Annual Mortality of Mingulay and Berneray SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	565
Table 4.253: Potential Annual Mortality of Mingulay and Berneray SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	568
Table 4.254: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Mingulay and Berneray SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects	569
Table 4.255: Details on the Qualifying Features of the Rathlin Island SPA	572
Table 4.256: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Rathlin Island SPA and Age Class Apportionment Estimates and Sabbatical Rate	574
Table 4.257: Potential Annual Mortality of Rathlin Island SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer	575

Table 4.258:	Potential Annual Mortality of Rathlin Island SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects	578
Table 4.259:	Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Rathlin Island SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects.....	579
Table 4.260:	Recommended Values for the Percentage of Birds Flying at Collision Risk Height (CRH) and Avoidance Rates from WWT (2014) and as Updated in Woodward et al. (2023), for all 40 Species Screened into the Migratory Collision Risk Assessment, Together With the Estimated Width of the Migration Corridor of the East Coast Population (Where Available). The Percentage of the Population Estimated to be at Potential Risk of Collision is Presented Assuming that all Birds Fly Through the Bellrock WFDA and as Amended According to the Width of Migration Corridor	586
Table 5.1:	Summary of Conclusions of the Assessment for the 22 Breeding Seabird Colony SPAs Taken Forward for Phase Two of the HRA Assessment	594

List of Plates

Plate 4.1:	Kittiwake Population Trend at Buchan Ness to Collieston Coast SPA between 1986 and 2023. The Red Line Shows the Citation Population Size for the Buchan Ness to Collieston Coast SPA (30,452 pairs). Data are From the Seabird Monitoring Programme Database.....	116
Plate 4.2	Kittiwake Population Trend at the Fowlsheugh RSPB Reserve between 1986 and 2023 (with this Site Accounting for 71% of the SPA Population Estimate in 2018). The 2018 Estimate for the Entire Fowlsheugh SPA is also Shown. The Red Line Shows the Citation Population Size for the SPA (36,650 pairs). Data are from the Seabird Monitoring Programme Database	140
Plate 4.3:	Razorbill Population Trend at the Fowlsheugh RSPB Reserve Between 1986 and 2023 (Noting that this Site Accounts for a High Proportion of the SPA Population – see text). The Red Line Shows the Citation Population Size for the SPA (5,800 breeding individuals). The Number of Individuals is Calculated as the Count of Individuals from the Seabird Monitoring Programme Database Multiplied by 1.34.....	155
Plate 4.4:	Kittiwake Population Trend at the St Abb’s Head NNR Between 1986 and 2024, with Four Counts for the Entire St Abb’s Head to Fast Castle SPA also Shown. The Red Line Shows the Citation Population Size for the SPA (21,170 pairs). Data are from the Seabird Monitoring Programme Database	170
Plate 4.5:	Puffin Population Trend at Farne Islands SPA Between 1989 and 2024. The Red Line Shows the Citation Population Size for the SPA (76,798 individuals). Data are from the Seabird Monitoring Programme Database	201
Plate 4.6:	Puffin Population Trend on the Isle of May (Which Holds Almost 90% of the Forth Islands SPA Population) between 1984 and 2024. The Red Line Shows the Citation Population Size for the Forth Islands SPA (14,000 Breeding Pairs). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)	237
Plate 4.7:	Gannet Population Trend at the Forth Islands SPA for the Period 1985 - 2023. The Red Line Shows the Citation Population Size for the SPA (21,600 pairs). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025) and Harris et al. (2023)	246
Plate 4.8:	Kittiwake Population Trend at Troup and Lion’s Heads RSPB Reserve Between 1986 and 2023, With Counts for the Entire Troup, Pennan and Lion’s Heads SPA Population Also Shown. The Troup and Lion’s Heads RSPB Reserve Holds the Majority of the SPA Population. The Red Line Shows the Citation Population Size for the SPA (31,600 pairs)	267
Plate 4.9:	Puffin Population Trend at Coquet Island SPA between 1986 and 2024. The Red Line Shows the Citation Population Size for Coquet Island SPA (31,636 Individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025).....	293
Plate 4.10:	Kittiwake Population Trend at the Flamborough & Filey Coast SPA Between 1987 and 2022. The Red Line Shows the Citation Population Size for the SPA (89,040 Individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025).....	379
Plate 4.11:	Gannet Population Trend at the Flamborough and Filey Coast SPA for the Period 1986 - 2024. The Red Line Shows the Citation Population Size for the SPA (16,938 individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025).....	402

Glossary of Terminology

Term	Definition
Air gap	The lowest blade tip point of a wind turbine to sea clearance distance (see individual chapters for the relevant tidal levels).
Applicant	Bellrock Offshore Wind Farm Limited, the legal entity submitting Section 36 Consent and Marine Licence applications for Bellrock Offshore Wind Farm Development Area.
Bellrock Offshore Wind Farm (or the Bellrock Project)	An offshore wind farm capable of exporting up to 1.8 GW of renewable energy to the National Electricity Transmission System. The Wind Farm Development Area is located 120 km east of Stonehaven, and will connect to the National Electricity Transmission System at the proposed SSEN Transmission Hurlie substation, west of Stonehaven in Aberdeenshire. The Bellrock Offshore Wind Farm comprises of the following Development Areas: ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Biologically defined minimum population scale (BDMPS)	The estimated population size of a species within a defined biogeographic area during a biologically relevant season, as defined by Furness (2015). For many seabird species present in UK waters there are two defined biogeographic areas; UK Western waters and UK North Sea and Channel. However, some species have different defined BDMPS areas, dependent on the distribution and movements of the species population through the year. Furness (2015) defines the BDMPS for non-breeding seasons; the breeding season BDMPS is defined as the breeding population within foraging range from the project, plus non-breeders and immatures.
Cable protection	Protective measure to minimise the effects of scour and hazards along the inter-array cables, and protecting these cables at infrastructure crossing points.
Collision Risk Modelling	Collision Risk modelling (CRM) refers to the process of estimating the likelihood of seabirds colliding with wind turbines, which can lead to injury or death. This modelling is crucial for assessing the impact of offshore wind developments on seabird populations and is guided by the Joint advice note from Statutory Nature Conservation Bodies (SNCBs) and other advisory bodies. The model takes into account various factors such as flight heights, flight agility, and the degree to which birds avoid turbines or wind farms. It aims to predict the number of seabirds expected to collide with a proposed windfarm each year, helping to understand the estimated collision risk and inform environmental assessments.
Commencement of construction	Commencement of construction to install the Wind Farm Infrastructure as authorised by the Wind Farm Development Area Section 36 Consent and Marine Licence (excluding site preparation works), being the earlier of: ▪ Intrusive pre-installation surveys; ▪ Placement on or installation in the seabed of anchors and associated scour protection, and mooring lines; ▪ Trench excavation for inter-array cables; or Trenching for, or laying of inter-array cables on or in the seabed.

Term	Definition
Construction works	Works to install the Wind Farm Infrastructure as authorised by the Wind Farm Development Area Section 36 Consent/Marine Licence, such as: ▪ Site preparation works undertaken after commencement of construction; ▪ Pre-installation surveys (intrusive and/or non-intrusive); ▪ Placement on or installation in the seabed of anchors and associated scour protection, and mooring lines; ▪ Towing or transportation of the floating offshore unit to the Wind Farm Development Area from a port or wet storage facility; ▪ Floating offshore unit installation and commissioning, including hooking-up to the pre-installed mooring system; ▪ Trench excavation for inter-array cables; ▪ Laying of inter-array cables in or on the seabed and associated cable protection; ▪ Installation of subsea cable hubs, including placing of associated foundation; ▪ Final commissioning following cable connections and snagging; and ▪ Post installation surveys.
Confidence Interval	A range of values, derived from sample data, that is likely to contain the true value of an unknown population parameter. It is expressed with an associated confidence level (e.g. 95%), which indicates the probability that the interval includes the parameter. Confidence intervals provide a measure of uncertainty around an estimate.
Floating offshore unit	The combined wind turbine generator and floating substructure.
Inter-array cable	Armoured cable containing electrical and fibre optic cores, which link the wind turbine generators to each other and to the subsea cable hubs and/or the offshore substations and include dynamic inter-array cable and static inter-array cable sections.
Likely Significant Effect (LSE)	Meaning that there may be (as opposed to is likely to be) a significant effect of a proposal on the integrity of the site and its conservation objectives.
Migration free breeding season	The breeding season for migratory seabird species is defined as a wider breeding season and a narrower window known as the migration free breeding season. In a given species, the timing of breeding will vary depending on the location of the breeding area; with the start of breeding usually later in more northerly locations. Thus, while birds at some colonies are beginning to nest, others may still be migrating to breeding sites. A core or migration free breeding season is defined as the period when all or the majority of breeding adults of a given species are present at breeding colonies.
Offshore Development Area	The area comprising: ▪ The Wind Farm Development Area; and ▪ The Offshore Transmission Development Area.

Term	Definition
Offshore Transmission Development Area	The boundary within which the Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned (and includes the whole of the Wind Farm Development Area).
Onshore Transmission Development Area	The boundary within which the Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.
Operational life	The expected operational life of the Wind Farm Infrastructure from the Commercial Operation Date to the first floating offshore unit being decommissioned.
Population Viability Analysis (PVA)	Population viability analysis (PVA) is a species-specific method of risk assessment used in conservation biology. It determines the probability of a population going extinct within a given number of years and integrates ecological and statistical methods to forecast population health and extinction risk. Each PVA is unique and developed for a specific target population or species, aiming to ensure long-term sustainability.
ScotWind	A Crown Estate Scotland leasing round for offshore wind projects in which the process enabled developers to apply for seabed rights to plan and build wind farms in Scottish waters.
Scour protection	Protective material positioned around anchors to avoid sediment being eroded as a result of the flow of water.
Site preparation works	Preparatory activities undertaken within the Wind Farm Development Area prior to the commencement of construction of the Wind Farm Infrastructure, which may comprise (and which may require separate consents): ▪ Geophysical surveys, geotechnical surveys, and non-archaeological/archaeological diver/ROV surveys; ▪ Seabed preparation including sand wave levelling, slope levelling for gravity based anchors (if selected), boulder clearance, and pre-lay grapnel runs; ▪ UXO survey and/or clearance; ▪ Debris clearance; and ▪ Out of service cable/pipeline removal.
Subsea cable hub	A subsea device, with a gravel pad foundation, which allows the connection of multiple inter-array cables.
Wet Storage	The temporary storage/anchorage of floating substructures and/or floating offshore units prior to their transportation to the Wind Farm Development Area.
Wind Farm Development Area	The boundary within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Infrastructure	Infrastructure located within the Wind Farm Development Area including wind turbine generators; floating substructures, station keeping systems and associated scour protection; inter-array cables and associated cable protection; subsea cable hubs; and ancillary infrastructure including buoys (including activities associated with the Bellrock Wind Farm Infrastructure construction, operation and maintenance, and decommissioning).

Term	Definition
Wind turbine generator	A wind turbine generator converts wind energy into electrical energy. The main components include rotor assembly (composed of three blades and a hub); nacelle (containing the generator, shaft and gearbox, power electronic converter and transformer); and a tower (containing lifting equipment and switchgear).

Glossary of Abbreviations

Term	Definition
AEoSI	Adverse effect on site integrity
BDMPS	Biologically defined minimum population scales
BTO	British Trust for Ornithology
CEF	Cumulative effects framework
CI	Confidence Interval
CIA	Cumulative impact assessment
CPGR	Counterfactual population growth rate
CPS	Counterfactual population size
CRH	Collision risk height
CRM	Collision risk model
DAS	Digital Aerial Surveys
EIA	Environmental impact assessment
EMF	Electromagnetic field
FOU	Floating offshore unit
FSS	Floating substructure
GSD	Ground Sample Distance
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitats Regulations Appraisal
IAC	Inter-array cables
JNCC	Joint Nature Conservation Committee
km	Kilometres
mCRM	Migratory collision risk model
MD-LOT	Marine Directorate - Licensing Operations Team
MW	Megawatt
NEEOG	Northeast and East Ornithology Group
OASA	Offshore aerial survey area
OfSS	Offshore substation

Term	Definition
OFTDA	Offshore Transmission Development Area
OnTDA	Onshore Transmission Development Area
OWF	Offshore wind farm
PVA	Population viability analysis
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SACO	Supplementary Advice to the Conservation Objectives
sCRM	Stochastic Collision Risk Model
SD	Standard Deviation
SKS	Station keeping system
SMP	Seabird Monitoring Programme
SNCB	Statutory Nature Conservation Body
SOSS	Strategic Ornithology Support Services
SPA	Special Protection Area
SSC	Suspended sediment concentration
UK	United Kingdom
UXO	Unexploded ordnance
VMNSP	Vessel Management and Navigational Safety Plan
WFDA	Wind Farm Development Area
WTG	Wind turbine generator

1 Introduction and Consultation

1. This Report represents Part 3 of the Report to Inform Appropriate Assessment (RIAA) for the Bellrock Wind Farm Infrastructure located within the Bellrock Wind Farm Development Area (WFDA), presents Special Protection Areas (SPA) and Ramsar Assessments, with the information required to inform the Appropriate Assessment of SPAs and Ramsar sites designated for ornithological qualifying features.
2. Upfront sections, providing the background to the Bellrock WFDA, the legislative and policy context for Habitats Regulations Appraisal (HRA), a description of the HRA process, a description of the Bellrock Wind Farm Infrastructure (and associated activities), as well as an overview of consultation undertaken are presented in **RIAA Part 1: Introductory Chapters (Volume VI)**.
3. The Special Area of Conservation (SAC) Assessment with the information required to inform the AA of SACs, limited in this RIAA to site designated for marine mammal qualifying features, is presented in **RIAA Part 2: Special Area of Conservation Assessments: Marine Mammals (Volume VI)**.
4. Consultation undertaken to date to inform the **RIAA Part 3: SPA and Ramsar Assessments - Ornithology (Volume VI)** has been undertaken in line with the general process described in Section 4 of the **RIAA Part 1: Introductory Chapters (Volume VI)**. Key consultation pertinent to this document is provided in **Table 1.1** below.

This page is intentionally blank

Table 1.1: Consultation Relevant to Offshore Ornithology Habitats Regulations Appraisal

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot confirmed that the Berwick Bank Offshore Wind Farm Project approach for herring gull to determine non-breeding season connectivity should be followed (i.e. the breeding season foraging range should be used).	Non-breeding season connectivity is based on breeding season foraging range for herring gull as per NatureScot advice. For further details, see: Section 10.6.1.4 and Table 10.5 in Chapter 10: Offshore Ornithology (Volume II).
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot advised that they would provide confirmation on their advised approach to determining connectivity and estimating apportioning for puffin in the non-breeding season.	Concluded in an email from NatureScot of 19 July 2024, see below. For further details see: Section 4.4.4.3.1.
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot confirmed that collision risk Guidance Note 7, due to be updated at the end of December 2023, would include recommended updates to avoidance rates to be used in Collision Risk Modelling, and will no longer include recommendation to use Collision Risk Model (CRM) output option 3. NatureScot advised that any gaps in recommended parameters for use in CRM can be covered by direct correspondence between NatureScot and the Project.	Further correspondence with NatureScot on CRM parameters initiated in a meeting between Applicant and NatureScot on 19 June 2024, with advice on the parameters provided in email from NatureScot of 12 July 2024 and 19 July 2024, and subsequent agreement in email from NatureScot of 10 December 2024 that the CRMs should use the avoidance rates as presented in the <i>'Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments'</i> which was published in late 2024, see below.
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot confirmed that for CRM, it recommends using the 2022 update to the Stochastic Collision Risk Model (sCRM) Shiny App, which is based on the stochLAB package. NatureScot confirmed that it will look at both the deterministic and stochastic outputs in the round and both would be considered in process of determining effects.	Collision risk modelling has used the updated shiny app (Caneco 2022), with both deterministic and stochastic outputs presented in Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV) . For further details, see: Section 4.1.2.4.
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	In CRM for gannet, NatureScot advised that they will accept macro-avoidance in non-breeding season, but their advice will be that it should not be included in breeding season collision estimation. This is due to the NatureScot view that the evidence base for the occurrence of macro-	Macro-avoidance is applied in non-breeding season but not in the breeding season for gannet collision risk modelling. For further details, see:

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		avoidance (or at least the level of macro-avoidance) is weaker for the breeding season than for the non-breeding season, and the advice is provided with account taken of the recently published Natural England commissioned review of macro-avoidance by gannet.	▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); and ▪ Section 4.2.2.
NatureScot	Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot noted that the Applicant should undertake the assessment according to their guidance, but if the Applicant considers that there is a justifiable basis for adopting variations to this guidance, NatureScot requested that for any departure from guidance or roadmap agreed approaches, that this is transparently/clearly presented in the EIA Report, and be discussed with NatureScot (noting that Berwick Bank was an enormous assessment which adopted different approaches but that it was produced in such a way that it was easy to follow the rationale/methods adopted).	The Applicant has sought to follow NatureScot guidance, and advice received during consultation, throughout the assessment. The approach used has been set out in relevant sections in this report, and also in more detail in the accompanying Bellrock WFDA Environmental Impact Assessment (EIA) Report Appendices, listed below: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV); ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); ▪ Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV); ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV).
NatureScot	Email dated 20 December 2023, follow-up on meeting minutes from the Bellrock WFDA Scoping Workshop held on 30 October 2023	NatureScot advised they are reviewing their position on non-breeding season assessments for puffin and will provide further guidance in due course. They also confirmed that Collision Risk Guidance Note 7 is still being updated, with publication expected in Q1 2024.	Concluded at email from NatureScot of 19 July 2024, see below.
NatureScot	Email, 12 July 2024, response to Bellrock Offshore Wind Farm: Proposed input parameters for CRM	Agreement that option 2 of the sCRM and option 2 of the deterministic CRM should be run.	Both deterministic and stochastic models have been undertaken for each species and wind turbine generator (WTG) design scenario that have been considered. In all cases, Option 2 of the

Consultee	Document/Date	Comment	How/Where Comment is Addressed
	(Memo dated 19 June 2024, PC3637-RHD-OF-XX-ME-SO-0001)		model has been used, as advised by NatureScot. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV).
NatureScot	Email, 12 July 2024, response to Bellrock Offshore Wind Farm: Proposed input parameters for CRM (Memo dated 19 June 2024, PC3637-RHD-OF-XX-ME-SO-0001)	NatureScot advised the use of the Caneco (2022) version of the sCRM and the deterministic CRM (with seed specified to enable repeatability).	Following advice received from NatureScot, all collision risk models (CRMs) for the Bellrock Wind Farm Infrastructure have been run in the Caneco (2022) shiny app. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV).
NatureScot	Email, 12 July 2024, response to Bellrock Offshore Wind Farm: Proposed input parameters for CRM (Memo dated 19 June 2024, PC3637-RHD-OF-XX-ME-SO-0001)	Confirmed that for species where a range of values for nocturnal activity factor is given, that the central value 0.375 and Standard Deviation (SD) of (0.0637) that results in 0.25 and 0.5 being captured in the 95% should be used.	The species input parameters for the CRMs were based upon the recent joint SNCBs collision risk guidance and additional advice provided by NatureScot, as agreed in emails from NatureScot of 12 July 2024, 19 July 2024 and 10 December 2024. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV).
NatureScot	Email, 12 July 2024, response to Bellrock Offshore Wind Farm: Proposed input parameters for CRM (Memo dated 19 June 2024, PC3637-RHD-OF-XX-ME-SO-0001)	NatureScot confirmed agreement to run the sCRM/CRM for gannet with a macro-avoidance rate of 70% applied in the non-breeding periods.	The species input parameters for the CRMs were based upon the recent joint SNCBs collision risk guidance and additional advice provided by NatureScot. A 70% macro-avoidance rate is applied to the gannet sCRM/CRM in the non-breeding periods. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV).
NatureScot	Email from NatureScot to Applicant on 19 July 2024, response to Bellrock Offshore Wind Farm: NatureScot advice on:	Meeting Minutes - Item 1 and Item 2 (density estimates): Following discussions during the call on 19 June (as recorded in meeting minute items 1 and 2) and further review of the findings reported in the Bellrock 2-year DAS report, NatureScot advise that they are content to accept	Following advice received from NatureScot, design-based approaches only were used for deriving density estimates for all species except guillemot. Density estimates for guillemot were generated by both approaches, on the basis that guillemot was the most abundant and frequently occurring species in the

Consultee	Document/Date	Comment	How/Where Comment is Addressed
	Actions recorded for NatureScot in meeting minutes from the call on 19 June 2024 (document reference: PC3637-RHD-WF-XX-MI-SO-0001; received by email on 20 June 2024) and CRM parameters – final values (document titled: CRM parameters final values 150724; received by email on 16 July 2024)	the use of design-based estimates and advise that in this case it does not require model-based density estimates.	Bellrock Digital Aerial Survey (DAS) and, therefore, the most suitable species for the application of model-based methods. Following a comparison of the design-based and model-based estimates of guillemot density presented in Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV), no benefit to the use of the model-based densities was identified and hence the assessment for guillemot relies on the design-based estimates. For further details, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV).
NatureScot	Email from NatureScot to Applicant on 19 July 2024, response to Bellrock offshore Wind Farm: NatureScot advice on: Actions recorded for NatureScot in meeting minutes from the call on 19 June 2024 (document reference: PC3637-RHD-WF-XX-MI-SO-0001; received by email on 20 June 2024) and CRM parameters – final values (document titled: CRM parameters final values 150724; received by email on 16 July 2024)	Meeting Minutes - Item 4 (apportioning for puffin in the non-breeding season): Further to the query raised regarding the assessment of distributional response impacts to puffin during the non-breeding season, this has not typically been undertaken previously due to puffin dispersal patterns post-breeding. However, some sites have now observed a peak of puffin during the dispersal period. For these sites NatureScot can now confirm that a non-breeding season assessment should be undertaken quantitatively through the EIA assessment, i.e. using an annual mortality (breeding season plus non-breeding season) with a regional population. Given the current evidence available, we advise that this would not be required to be undertaken quantitatively within the HRA. However, we recommend that this is addressed qualitatively within the conclusions for puffin.	Assessments for SPA puffin populations in the non-breeding period are addressed qualitatively. For further details, see relevant sections in: ▪ Section 4.4. In addition, a non-breeding assessment is undertaken for puffin using annual mortality with a regional reference population within the Chapter 10: Offshore Ornithology (Volume II).
NatureScot	Email from NatureScot to Applicant on 19 July 2024, response to Bellrock offshore Wind Farm: NatureScot advice on:	NatureScot advice – CRM parameters final values: NatureScot have reviewed the CRM parameters – final values, shared by email on 16 July 2024 (document titled: CRM parameters final values 150724) and note the	CRM parameters were based upon the recent joint SNCBs collision risk guidance and additional advice provided by NatureScot, as agreed in emails from NatureScot of 12 July

Consultee	Document/Date	Comment	How/Where Comment is Addressed
	Actions recorded for NatureScot in meeting minutes from the call on 19 June 2024 (document reference: PC3637-RHD-WF-XX-MI-SO-0001; received by email on 20 June 2024) and CRM parameters – final values (document titled: CRM parameters final values 150724; received by email on 16 July 2024)	request for confirmation included within this email (as copied in below). <i>"Please could NatureScot confirm that they are content that these are the final values that we will use in our modelling and acknowledge that any new guidance/changes to guidance will not be updated/included in our modelling and assessment once our modelling has commenced."</i> NatureScot confirm that they are content the values provided (as per document: CRM parameters final values 150724) reflect the recent advice provided to Bellrock. NatureScot is aware of the importance of timescales and the need to have cut off points for additional information, therefore we also confirm that should NatureScot's collision risk guidance note be updated after Bellrock have started undertaking the relevant modelling they are not required to include the updates.	2024, 19 July 2024 and 10 December 2024. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Modelling Technical Report (Volume IV); and ▪ Section 4.1.2.4.
NatureScot	Email from NatureScot to Applicant on 26 July 2024. Response to table comparing the densities of key species of seabird (document titled: Year 1 and 2 Combined + Alone Densities V2.0; received on 11 July 2024), as discussed in meeting of 19 June 2024	Following a review the year 1 and year 2 combined and alone densities, NatureScot advise that both year 1 and 2 are used to derive values for the baseline for Bellrock, acknowledging there is substantial variability observed in the densities, which is likely to reflect recent mass mortality events, and that there are uncertainties around the long-term effects of these. NatureScot therefore recommend that the assessment also includes commentary on this observed variability and any implications for the assessment. NatureScot confirmed their advice on 26 July 2024 supersedes their advice on this subject issued on 10 July 2024.	Year 1 and 2 densities are used to derive baseline values for Bellrock. For further details, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV); and ▪ Section 4.2.1.3.
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.2	Scottish Ministers advise that they are content with data sources listed in Section 9.4.2 and Table 9.3 of the Bellrock WFDA Scoping Report. NatureScot note the data covers March 2022 to February 2023; a second full year	Two full years of DAS have been completed, and the two annual reports (and a comparison of the separate and combined years of density/abundance estimates) have been shared with NatureScot before the Bellrock WFDA consent applications were

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		of DAS should be included before application to ensure a complete baseline and allow resolution of issues.	submitted. The full two years of DAS data have been used to inform the assessment. For further details, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV); and ▪ Section 2.2.1.
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.3	Scottish Ministers advise that they are content with impacts scoped in (Section 9.6.1/Table 9.5 of the Bellrock WFDA Scoping Report) but agree with NatureScot that vessel movement disturbance, lighting effects (including on nocturnal species), and impacts from wet storage should be considered. Broadly agree with impacts scoped out in Section 9.6.2.	Within the Bellrock WFDA RIAA, potential lighting effects have been considered but are not screened in as an impact pathway. This is because no potential for a Likely Significant Effect (LSE) was concluded in relation to any of the SPA qualifying features for which there is considered to be the potential for impacts from lighting, as determined on the basis of the two years of baseline DAS data. In this regard it is important to note that the NatureScot advice referred to by MD-LOT is stated to be in relation to “<i>Species such as European storm petrel, Leach’s storm-petrel and Manx shearwater....</i>”. However, no connectivity with the Bellrock WFDA is concluded for any of these three species (with a single European storm petrel and no Leach’s storm petrel or Manx shearwater recorded during the two years of baseline DAS). Details on the basis for the conclusions on the absence of connectivity are provided in: ▪ Section 2. Vessel disturbance is considered as a potential impact pathway, being incorporated into the ‘Disturbance’ impact pathway which is considered for marine SPAs and breeding seabird colony SPAs during the construction, operations and maintenance (O&M) and decommissioning phases. This includes the potential for impacts on marine SPAs resulting from vessel movements between the WFDA and ports. For further details, see: ▪ Section 2; ▪ Section 4.1; ▪ Section 4.3; and ▪ Section 4.4.

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			In addition, effects from both lighting and vessel movement disturbance are considered within Chapter 10: Offshore Ornithology (Volume II). The temporary mooring of floating substructures (FSSs) and/or floating offshore units (FOUs) at dedicated locations (known as 'wet storage') for the Bellrock Project will be considered through separate consenting process(es) as required. The Applicant is not seeking consent for wet storage within this application. Any proposed projects in the public domain for wet storage facilities on the east coast of Scotland have been considered within the cumulative assessment along with other projects and plans (Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)).
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.4	Ministers support the proposed assessment approach but require NatureScot's advice on guillemot/razorbill correction factors, apportioning, density estimates, collision risk modelling, Population viability analysis (PVA), and HPAI to be fully implemented in the Bellrock WFDA EIA Report.	NatureScot advice is implemented regarding guillemot/razorbill breeding population correction factors. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV). NatureScot advice is implemented regarding apportioning. For further details, see: ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV). NatureScot advice is implemented regarding density estimates. For further details, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV). NatureScot advice is implemented regarding CRM. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			NatureScot advice is implemented regarding PVA. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV). NatureScot advice is implemented regarding HPAI. For further details, see: ▪ Section 4.2.1.2; and ▪ Chapter 10: Offshore Ornithology (Volume II).
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.6	MD-LOT broadly support the cumulative impact assessment (CIA) approach (Section 9.6.3 of Bellrock WFDA Scoping Report) and advise that if the Cumulative Effects Framework (CEF) is published during the project, it should be used, and Natural England's cumulative and in-combination comments must also be addressed.	For displacement and collision impacts, the in-combination mortalities on each SPA for the other plans and projects were taken from the totals collated by the Northeast and East ScotWind Region Ornithology Group (NEEOG) Interim CEF project, using the most recently available update to these totals (i.e. April 2025), and as agreed with NatureScot (see below). For further details, see: ▪ Section 3.4; ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ The CIA is detailed in Chapter 10: Offshore Ornithology (Volume II).
Natural England	Representation on the Bellrock WFDA Scoping Report (2024)	3. Cumulative and in-combination effects A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment. The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out.	As above

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		The following types of projects should be included in such an assessment, (subject to available information): a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the	
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.9	NatureScot do not recommend screening out breeding season sites/features until the full two-year survey data is available; conclusions can be reviewed after second year report is available. The Applicant is also directed to the comment regarding seabird assemblages and should ensure that this is reflected in the Bellrock WFDA EIA Report.	The assessment reflects the result of the full 2-year DAS data. The findings of RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI) - are reviewed and revised in Section 2. The Applicant correctly assigned features as only being named components of the seabird assemblage feature within the RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI) with the NatureScot comment on this point in their representation being clarified in the email from NatureScot of 4 October 2024. Within Section 4.4, named components of the seabird assemblage feature are assessed at the individual species level in the same way as individual species that are qualifying features.
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.10	MD-LOT advise that lighting effects and vessel disturbance should be considered as potential impact pathways for all phases of the development.	Lighting effects were considered as a potential impact pathway but were not screened in within the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments - Ornithology (Volume VI). This is because no potential for connectivity with the Bellrock WFDA (and, hence, for a Likely Significant Effect (LSE)) was concluded in relation to any of the SPA qualifying features for which there is considered to be the potential for impacts from

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			lighting, as determined on the basis of the two years of baseline DAS data (see above). Details on the basis for the conclusions on the absence of connectivity are provided in: ▪ Section 2. Vessel disturbance is considered as a potential impact pathway, being incorporated into the 'Disturbance' effect pathway which is considered for marine SPAs and breeding seabird colony SPAs during the construction, O&M and decommissioning phases. For further details, see: ▪ Section 2.2; ▪ Section 4.1; ▪ Section 4.3; and ▪ Section 4.4. In addition, effects from both lighting and vessel movement disturbance are considered within Chapter 10: Offshore Ornithology (Volume II).
MD-LOT	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.6.12	Paragraph 5.6.12 of Scoping Opinion: MD-LOT do not expect two separate offshore ornithology assessments; NatureScot guidance should be followed, but differences between Natural England and NatureScot approaches (especially for English seabirds in in-combination assessments) should be acknowledged in the EIA and RIAA.	NatureScot guidance is followed at all stages of the assessment. The Applicant acknowledges that there are some differences in the approach advised by Natural England. The Natural England guidance results in a different approach in respect of guillemot as compared to the NatureScot guidance. Applying the Natural England guidance would result in connectivity with SPA populations during the non-breeding season. The NatureScot guidance results in no connectivity. However, even if applying the Natural England approach, any predicted impacts on guillemot populations at English SPAs would be very small because of the low densities of guillemot recorded within the Bellrock WFDA and 2 km buffer during the non-breeding period months by baseline DAS survey (Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)). This combined with the low apportioning values that would

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			be applied to individual SPA populations (as per Furness, 2015) would result in very low predicted non-breeding season impacts. It considered unlikely therefore that applying the Natural England guidance would result in a materially different conclusion to the effects reported on within this report or within Chapter 10: Offshore Ornithology (Volume II). The NatureScot guidance has been applied in this assessment having regard to the location of the Bellrock WFDA in the Scottish offshore region, and that the applications are to be determined by Scottish Ministers in consultation with NatureScot.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	NatureScot recommend submission of the baseline characterisation DAS report during the pre-application stage rather than waiting until the application is submitted. This will enable any issues to be discussed and resolved in a timely manner.	Extensive consultation was undertaken with NatureScot on the 2-year DAS report (HiDef, 2024) (e.g. see response to Email from NatureScot to Applicant on 26 July 2024 above). This report and Chapter 10: Offshore Ornithology (Volume II) have been produced taking into account this NatureScot advice.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	NatureScot expect the ornithological impact assessment to be based on our published guidance. Any deviation must be discussed and agreed in advance.	All aspects of the offshore ornithological impact assessment are based on the relevant NatureScot Guidance notes, with the exception of aspects of the assessments carried out based on NatureScot advice specifically given to the Applicant and which does not align fully with the guidance, as set out in this table.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Baseline Characterisation – As per Section 9.4 [of the Bellrock WFDA Scoping Report], this scoping exercise has been informed by available data from the project's year one aerial survey programme (i.e. for the period between March 2022 and February 2023 inclusive). Provided a full second year of DAS has been completed, and the data set covers two full breeding and non-breeding seasons, NatureScot anticipate that this will provide a sufficient baseline. If there are any gaps within the survey coverage (e.g. missed dates, surveys flown over multiple days) this will need to be discussed, and possible solutions provided.	The assessment is based on the full 2-year DAS data, as agreed with NatureScot. As detailed above, NatureScot reviewed the Bellrock 2-year DAS report, providing comments which have been addressed by the Applicant. For further details, see: ▪ Section 2.2.1; and ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Further advice will be provided once the full baseline characterisation report is received. This should follow NatureScot's advice as per Guidance Note 210, and NatureScot recommend this is submitted prior to application so that any issue can be discussed and resolved in advance. Selection of species for detailed assessment should be based on the two full years of survey data.	The assessment has been undertaken in accordance with NatureScot guidance and advice received throughout consultation and is based on the full 2-year DAS data. For further details, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV). For further details on species taken forward to Phase Two of the HRA assessment, see: ▪ Section 2.2.1; and ▪ Section 2.3.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Over the past couple of years there have been large seabird mortality events, notably the auk wreck along the East Coast of Scotland in 2021 and the ongoing outbreak of HPAI. When comparing the Year 1 DAS findings to the Year 2 findings, any local or regional mortality events information should be considered when interpreting the results.	Local and regional mortality events information is considered where relevant in the species assessments in Section 4.4 Assessment of Potential Adverse Effects on Integrity: Breeding Seabird Colony SPAs. Specific consideration of the implications of HPAI in relation to the assessment conclusions is provided in: ▪ Section 4.2.1; and ▪ Chapter 10: Offshore Ornithology (Volume II).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Disturbance and displacement pathways should include vessel movements between the WFDA and the ports being used in all phases of the project. Vessel movements have the potential to impact various species, including those sensitive to disturbance such as divers and sea ducks. This will depend on the ports used, routes taken and timing. This aspect requires further discussion during pre-application so agreement can be reached on assessment requirements.	Vessel disturbance and associated displacement due to vessel movements between the WFDA and ports is considered as a potential impact pathway on relevant qualifying features of marine SPAs, being incorporated into the 'Disturbance/Displacement' effect pathway which is considered for marine SPAs during the construction, O&M, and decommissioning phases. For further details, see: ▪ Section 2.2; and ▪ Section 4.3.

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	With respect to nocturnal species, potential impacts from lighting should be considered. Species such as European storm petrel, Leach's storm-petrel and Manx shearwater may be attracted to and/or disorientated by artificial light sources. As well as turbine lighting, this should also include lighting on servicing or construction vessels, especially if construction will be a 24/7 operation. Such effects could influence assessment of collision and/or displacement. NatureScot recommend considering findings from the Marine Directorate commissioned review to inform the assessment of the risk of collision and displacement in petrels and shearwaters from offshore wind developments in Scotland.	Within the Bellrock WFDA RIAA, potential lighting effects have been considered but are not screened in as an effect pathway. This is because no potential for a Likely Significant Effect (LSE) was concluded in relation to any of the SPA qualifying features (i.e. nocturnal species) for which there is considered to be the potential for impacts from lighting, as determined on the basis of the two years of baseline DAS data. No connectivity with the Bellrock WFDA is concluded for any SPA populations of the three relevant species (as identified in the NatureScot comment), with a single European storm petrel and no Leach's storm petrel or Manx shearwater recorded during the two years of baseline DAS. Details on the basis for the conclusions on the absence of connectivity are provided in: ▪ Section 2.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	"Wet storage" could also be a significant impact pathway for ornithological receptors depending on the nature and location of activities associated with the construction assembly and maintenance of floating turbines. Agreement will be needed as to how this aspect is dealt with and assessed.	The temporary mooring of floating substructures FSSs and/or FOU's at dedicated locations (known as 'wet storage') for the Bellrock Project will be considered through separate consenting process(es) as required. The Applicant is not seeking consent for wet storage within this application. Any proposed projects in the public domain for wet storage facilities on the East Coast of Scotland have been considered within the cumulative assessment along with other projects and plans (Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – Seasonal definitions are in accordance with NatureScot's Guidance Note 9. Estimates of breeding seabird population sizes, will be obtained from the Seabird Monitoring Programme (SMP) database and should use Seabirds Count data. Non-breeding seabird population sizes will be taken from Furness (2015) - this approach follows our guidance.	Estimates of breeding seabird population sizes were obtained from the SMP database and use Seabirds Count data for the breeding season apportioning to breeding colony populations. Non-breeding seabird population sizes are taken from Furness (2015) for purposes of the non-breeding season apportioning to breeding colony populations. For further details, see: ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV). As detailed below, for purposes of assessing impacts against population sizes (including within PVAs) the most up-to-date

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			population data from the SMP are used, in accordance with the NatureScot representation (noting that in some cases this equates to the Seabirds Count data). In a very small number of instances the most up-to-date population size estimates have been derived from sources other than the SMP, where these sources are credible reports and the data are not yet available on the SMP. This is fully referenced within the application documents for the Bellrock WFDA. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Section 4.4.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – For guillemot and razorbill, the population size estimates in the SMP are presented as the number of individuals counted at the colony, and therefore, correction factors do need to be applied to the counts. The correction factors have recently been updated and can be found in the new Seabirds Count book. For guillemot the correction factor is now 1.49 and for razorbill it is 1.34.	The correction factors of 1.49 and 1.34, respectively, have been applied to the guillemot and razorbill count data (number of individuals) as derived from the SMP database. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV); and ▪ Section 4.4.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Foraging ranges are as per our Guidance Note 3.	Foraging ranges are in line with Guidance Note 3. For further details, see: ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV); and relevant sections of ▪ Section 4.4.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	With respect to apportioning, this will be done through the CEF in the future. This will incorporate both the 2018 Butler/Marine Directorate commissioned apportioning tool and NatureScot's theoretical approach as appropriate. The intention is that the CEF will use Seabirds Count data. The developers of the framework, the United	Apportioning of species to breeding colony populations during the breeding season has been undertaken using the 'theoretical approach' described in NatureScot's interim guidance (NatureScot, 2018). For some species the Marine Scotland (MS) apportioning tool (Butler et al. 2020) can also be used to provide apportioning estimates to breeding colonies, but this tool is not

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		Kingdom Centre for Ecology and Hydrology, are working with Marine Directorate regarding publication of the CEF, but NatureScot have no details on timescale at present.	currently available for use (and also relies on Seabird 2000 (1998-2002) colony count data, which are out-of-date and no longer suitable for purposes of the breeding season apportioning). In email of 4 October 2024, NatureScot confirmed that they consider the approach to the breeding season apportionment, as set out in Appendix 1.1: Bellrock WFDA Scoping Report (Volume IV) (i.e. using the NatureScot (2018) 'theoretical approach'), to be appropriate. For further details, see: ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – NatureScot have reviewed [Bellrock WFDA Scoping Report] Appendix 6 - Apportioning Breeding Season Impacts to SPA Seabird Populations. The breeding season apportionment detailed in Appendix 6 has been based on the four most abundant species in the first year of survey with theoretical connectivity based on foraging ranges. In relation to guillemot, although the assessment outlined follows NatureScot's guidance, due to the numbers present in the first year of the DAS NatureScot request a basic assessment of potential impacts is undertaken for guillemot in the breeding season using the regional population (such as Biologically defined minimum population scales (BDMPS)). This list of species should be reviewed when the results from the full two years of survey have been analysed.	The species subject to breeding season apportionment following two years of DAS data collection are detailed in Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV). In relation to guillemot, further clarifications were provided in email from NatureScot of 8 October 2024 (as detailed below in subsequent entries in the table), with agreement that there would not be an assessment of guillemot in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments - Ornithology (Volume VI) due to the lack of connectivity with SPA colonies during the breeding and non-breeding seasons but that the assessment for the regional populations should be based upon the maximum foraging range from Woodward et al. (2019) and use three seasonal periods (i.e. breeding, post-breeding and non-breeding). For further details, see: ▪ Section 2.2; ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV); ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Chapter 10: Offshore Ornithology (Volume II).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	The narrative provided in paragraphs 791 to 795 in Section 9.7.1 of the Bellrock WFDA Scoping Report (2024) which summarises recent use of model versus design-based estimates is helpful. NatureScot's guidance on density estimation and the preferred use of MRSea density modelling approaches has not changed, however NatureScot acknowledge that issues with number of data points and model fit can sometimes preclude use of this method.	As subsequently agreed with NatureScot, design-based and model-based (MRSea) density estimates for guillemot only have been presented in Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report . For reasons given in Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report , subsequent assessment (as set out in Section 4.4) has used design-based estimates only, as agreed with NatureScot.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	The data sources outlined in Section 9.7.6 of the Bellrock WFDA Scoping Report (2024) follow our NatureScot Guidance Note 7. However, as noted during the Scoping workshop, this guidance note is being updated and should be available shortly. Option 3 is no longer required.	The most recent guidance available when the assessment was being prepared has been used. As detailed above, advice from NatureScot on CRM parameters were provided in emails of 12 July 2024 and 19 July 2024, with subsequent agreement in email from NatureScot of 10 December 2024 that the CRMs should use the avoidance rates as presented in the ' <i>Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments</i> ' which was published in late 2024. The 2025 update to NatureScot Guidance Note 7 (NatureScot, 2025b) was not available at the time the CRMs had to be undertaken.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – With respect to use of a macro-avoidance rate for gannet highlighted in the Bellrock WFDA Scoping Report] paragraph 810, as discussed during the scoping workshop, NatureScot only accept its use for assessment of non-breeding season impacts.	Macro-avoidance has been applied to gannet density estimates used for the CRM for the non-breeding periods only, in accordance with NatureScot advice. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); and ▪ Section 4.2.2.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	The figures presented in Table 1 within Appendix 1 of NatureScot's Guidance Note 7 should be used for the deterministic assessment and the figures presented in Table 2 within Appendix 1 of Guidance Note 7 should be used for the stochastic assessment.	As detailed above, advice from NatureScot on CRM parameters were provided in emails of 12 July 2024 and 19 July 2024, with subsequent agreement in the email from NatureScot of 10 December 2024 that the CRMs should use the avoidance rates as presented in the ' <i>Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments</i> ' which was published

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		The figures presented in Table 9.9 can be used for both deterministic and stochastic assessments. Some of the parameter values identified [in Table 2 within Appendix 1] will no longer need to be consulted on as we will present these in our updated guidance note, however, some parameter values will still need to be discussed and agreed.	in late 2024. The 2025 update to NatureScot Guidance Note 7 (NatureScot, 2025b) was not available at the time the CRMs had to be undertaken. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	The displacement and mortality rates outlined in Table 9.8 (Section 9.7.5) of the Bellrock WFDA Scoping Report (2024) for use in the matrix-based displacement assessment are in line with NatureScot's guidance.	NatureScot guidance, including displacement and mortality rates, has been used in the assessment. For further details, see: ▪ Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV); and ▪ Section 4.4.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – Paragraph 813, Section 9.7.7 of the Bellrock WFDA Scoping Report (2024) notes that the use of the 0.02 percentage point change in adult mortality threshold [in PVA] may not be appropriate for some species. This is contrary to NatureScot's current guidance, and NatureScot's advice that that this threshold is used for all species.	The NatureScot advised threshold of 0.02 percentage point change has been used for all species when considering the requirement for PVA. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Section 4.4.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	In line with paragraph 815, Section 9.7.7 of the Bellrock WFDA Scoping Report (2024), NatureScot agree the most up to date population data from the SMP database should be used to provide baseline colony population sizes in the PVA. Agreement on use of species demographic data will be required once the JNCC review of Horswill and Robinson (2015) is complete – NatureScot expect this to be published shortly. Inclusion of any site-specific data should be discussed and agreed in advance.	The most recent counts from the SMP have been used for colony population sizes within the PVAs, with a very small number of exceptions. The exceptions are instances in which the most recent data are taken from credible reports, with these data not yet available on the SMP at the time the PVAs were undertaken, and are considered to provide reliable, contemporaneous, estimates for these SPA populations. Where this is the case, this is detailed in Table 2.1 of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV). As detailed below and following subsequent advice from NatureScot in email of 4 October 2024, species demographic data used in the PVA were derived from Horswill and Robinson

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			(2015). Any updates to these data (including the JNCC review) were not available at the time the PVAs were undertaken. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – Please be aware that NatureScot currently advise that collision impacts and distributional response impacts should be additive for kittiwake and gannet [in PVA]. This reflects the best publicly available evidence for considering these species which are susceptible to both impacts. With regards to the work undertaken by Natural England around macro-avoidance for gannet, NatureScot are not currently adopting the full recommendations of this work. NatureScot do however accept the output for gannet during the non-breeding season (Pavat et al, 2023).	The assessment has presented the additive effects of collision and displacement for kittiwake and gannet, in accordance with NatureScot advice and guidance. See response above confirming that macro-avoidance for gannet has been applied only in the spring and autumn passage (i.e. non-breeding) periods. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); ▪ Section 4.2.2; ▪ Section 4.4; and ▪ Chapter 10: Offshore Ornithology (Volume II).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Approach to Assessment – There is a need for ongoing engagement in relation to the impacts of HPAI and how to incorporate these impacts within assessments. Work is continuing within NatureScot to provide further information, which NatureScot will do when we can. In the meantime, NatureScot expect the impact of HPAI on colonies to be considered qualitatively especially when reviewing PVA outputs. As the DAS survey work straddles the HPAI outbreak years, it will be important for assessment purposes to consider the current status of seabird populations at SPA colonies. Surveys were undertaken in 2023 at various key seabird colonies affected by HPAI, coordinated by Royal Society for the Protection of Birds (RSPB), and some will be repeated in 2024. Recent data for key species at some sites can already be found on the SMP database.	A review of the effects of HPAI in relation to the assessment is presented in: ▪ Section 4.2.1; and ▪ Chapter 10: Offshore Ornithology (Volume II).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		RSPB have just published a report on HPAI effects which will provide helpful context: 'UK seabird colony counts in 2023 following the 2021-22 outbreak of HPAI Research Report 76. RSPB Conservation Science.'	
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	As per paragraph 786 of the Bellrock WFDA Scoping Report (2024), we agree that if the CEF is published within the project timeframe then it should be used to undertake the cumulative assessment. If it is not published, NatureScot are currently preparing guidance on aspects to be considered and presented in the EIA and RIAA.	At the time of writing the CEF has not yet been published. For displacement and collision impacts, the in-combination mortalities for the other plans and projects were taken from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025), as agreed in email from NatureScot of 7 February 2025. For further details, see: ▪ Section 3.4; ▪ Section 4.4; and ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV).
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	In addition, NatureScot have advised Marine Directorate that the Berwick Bank application will have an adverse effect on site integrity (AEoSI) either alone or in-combination for multiple seabird species within the UK European Site Network, some of which overlap with the species and sites assessed in other applications. Consequently, as the outcome of the Berwick Bank application is unknown at present, further advice should be sought from Marine Directorate on which sites and qualifying feature will need to be considered for the in-combination assessment.	Superseded. See later advice and response re: inclusion of Berwick Bank Wind Farm.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	We welcome the identification of "embedded mitigation measures" described in Section 9.5.1 of the Bellrock WFDA Scoping Report (2024) and summarised in Appendix 3 - Mitigation Register. The examples provided are appropriate, although the list of mitigation measures in	Confirmation of proposed embedded mitigation is provided in Chapter 10: Offshore Ornithology (Volume II).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		this Bellrock WFDA EIA Scoping Report is minimal given the early stage of project development.	
NatureScot	Representation on the Bellrock HRA Screening Report (2024)	We do not recommend the screening out of any sites/features before the data from the full two years of survey work is available, so that a full picture of how birds are interacting with the array footprint is understood. We note the detailed information provided and conclusions drawn in paragraph 318 in relation to five rarely occurring species and connectivity. We support the statement in paragraph 319 that these conclusions will be subject to review following the completion of the second year of the offshore aerial survey programme.	The assessment reflects the results of the full 2-year DAS data (see Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)). For further detail on any changes made to the SPAs (and qualifying features of those SPAs) taken forward to Phase Two of the HRA assessment as a result of this, see: ▪ Section 2.2.1; and ▪ Section 2.3.
NatureScot	Representation on the Bellrock HRA Screening Report (2024)	Table 7.2 lists the relevant qualifying features for each SPA. In various cases, features are only included as components of seabird assemblages when they should be listed as individual features in their own right, e.g. at Buchan Ness to Collieston Coast SPA. This also applies to Table 7.5.	The Applicant correctly assigned features as only being named components of the seabird assemblage feature within the RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI) with the NatureScot comment on this point in their representation being clarified in the email from NatureScot of 4 October 2024. Within Section 4.4, named components of the seabird assemblage feature are assessed at the individual species level in the same way as individual species that are qualifying features (see also Section 2.3).
NatureScot	Representation on the Bellrock HRA Screening Report (2024)	Construction and decommissioning: The potential effects of lighting on ornithological receptors should be considered as an impact pathway. Species such as European storm petrel, Leach's storm-petrel and Manx shearwater may be attracted to and/or disorientated by artificial light sources. Potential for LSE should be re-considered for these species in relation to this impact pathway depending on results from the second year of DAS. Operation and maintenance: As above, the potential effects of lighting on ornithological receptors should be	Lighting effects were considered as a potential impact pathway but were not screened in within the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments - Ornithology (Volume VI). This is because no potential for a Likely Significant Effect (LSE) was concluded in relation to any of the SPA qualifying features for which there is considered to be the potential for impacts from lighting, as determined on the basis of the two years of baseline Digital Aerial Survey (DAS) data (see above). No connectivity with the Bellrock WFDA is concluded for any SPA populations of the three relevant species (as identified in the NatureScot comment), with a single European storm petrel and no Leach's

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		considered as an impact pathway for operations and maintenance. This should include consideration of lighting on arrays and maintenance vessels.	storm petrel or Manx shearwater recorded during the two years of baseline DAS. Details on the basis for the conclusions on the absence of connectivity are provided in: ▪ Section 2.
NatureScot	Representation on the Bellrock HRA Screening Report (2024)	Construction and decommissioning: Paragraph 332 screens in the Outer Firth of Forth and St Andrews Bay marine SPA with respect to the potential for disturbance/displacement impacts from vessel movements between the WFDA and construction and or decommissioning Ports. Paragraph 333 however, screens out all other marine SPAs based on the distance alone. Given the early stage in project development combined with the broad envelope, we are concerned this is premature and advise further consideration may be required. Operation and maintenance: Similarly, we note that our comments above regarding disturbance from vessel movements also apply to the operation and maintenance phase.	After further consideration of the possible ports that may be used during the construction, O&M and/or decommissioning phases, the Moray Firth SPA and Scapa Flow SPA were also taken forward to the Phase Two HRA assessment and screened in for the potential impacts of disturbance/displacement from vessel movements between the WFDA and ports. For further detail, see: ▪ Section 2.2.1.2; ▪ Section 4.3.2; and ▪ Section 4.3.3.
NatureScot	Representation on the Bellrock HRA Screening Report (2024)	We note that Table 7.2 (see Section 7.1) identifies breeding seabird qualifying features which are included based on potential connectivity during the non-breeding season only. It would be helpful if Table 8.1 also did this - to add further clarity where it is apparent that the SPA is beyond breeding season foraging range for a particular species. We recommend details such as this are considered in the RIAA to aid consultees in their review.	Table 2.1 in Section 2.3 summarises the screened in qualifying features and denotes which of these have been screened in based on potential connectivity during the non-breeding season only.
Natural England	Representation on the Bellrock WFDA Scoping Report (2024)	For the Bellrock Offshore windfarm, Natural England advise that as a minimum, gannet from Flamborough and Filey Coast Special Protection Area (SPA) and Puffin from the Farne Islands SPA are scoped into the Environmental Statement and HRA. This is due to the windfarm being within the maximum foraging range of these colonies. We	Effects on features of the Flamborough and Filey Coast SPA (including gannet) and Farne Islands SPA (including puffin), as well as Coquet Island SPA, are addressed in this report. For further details, see: ▪ Section 2.3;

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		do not expect to provide further comments or advice on other receptors unless the project changes substantially.	▪ Section 4.4.4; ▪ Section 4.4.7; and ▪ Section 4.4.11.
NatureScot	Email from NatureScot to the Applicant on 4 October 2024 – Response to Actions and Agreements table received by NatureScot by email 9 September 2024	Regarding the apportioning appendix submitted as part of the Bellrock WFDA Scoping Report, NatureScot consider the approach to breeding season apportionment, as set out in the Bellrock WFDA Scoping Report – Appendix 6 to be appropriate. Appendix 6 follows the NatureScot guidance included within 'Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs' (2018). NatureScot noted the conclusions that any impacts arising from the Bellrock development are likely to affect birds from a small number of sites. Please also see pg. 18-19 of NatureScot's Scoping advice which addresses the Scoping question presented regarding data sources suggested for apportioning.	Noted. As detailed above, the apportioning undertaken for the breeding season colony populations uses the NatureScot (2018) interim guidance 'theoretical approach'. For further detail, see: ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV).
NatureScot	Email from NatureScot to the Applicant on 4 October 2024 – Response to Actions and Agreements table received by NatureScot by email 9 September 2024	Regarding species demographic data to use in assessment, NatureScot issued advice on the Broadshore Scoping Report on 11 March 2024 and the Bellrock WFDA Scoping Report on 13 May 2024. In the time between issuing the Broadshore and Bellrock advice NatureScot were made aware that an updated JNCC report on demographic rates may have been available within Bellrock's assessment timeline. NatureScot confirm that this is not going to be the case, as the report will not be published until late 2024, and therefore for Bellrock, Horswill and Robinson (2015) should be used for deriving demographic rates.	Noted. As detailed above, demographic rates from Horswill and Robinson (2015) have been used within the assessment, as advised by NatureScot. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Email from NatureScot to the Applicant on 4 October 2024 – Response to Actions and Agreements table received by NatureScot by email 9 September 2024	Regarding NatureScot's previous claim that Bellrock has erroneously assigned features as only being named components of the seabird assemblage feature for some SPAs (in Table 7.5 of the HRA Screening), NatureScot note the confusion around their advice regarding assemblage features for SPAs. To clarify further, any named qualifying species of an assemblage feature in an SPA is protected in their own right. The SPA conservation objectives are set for individual species rather than the assemblage and therefore the features should be assessed and any impacts concluded at the individual species level. Provided this is undertaken no further action is required.	Noted. Assemblage species have been assessed at the individual species level, as advised by NatureScot. For further detail, see: ▪ Section 4.4.
NatureScot	Email from NatureScot to the Applicant on 4 October 2024 – Response to Actions and Agreements table received by NatureScot by email 9 September 2024	Regarding confirmation whether there is a need for model-based density estimates for species screened in for collisions, NatureScot consider this point to be closed following advice issued on 19 July 2024: "Following discussions during the call on 19 June [2024] (as recorded in meeting minute items 1 and 2) and further review of the findings reported in the Bellrock 2-year DAS report, we are content to accept the use of design-based estimates and advise that in this case we do not require model-based density estimates.	Noted. Design-based density estimates have been used for CRMs, as agreed with NatureScot. For further detail, see: ▪ Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline (Volume IV); ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); and ▪ Section 4.4.
NatureScot	Email from NatureScot to the Applicant on 8 October 2024	Regarding assessment for guillemot, NatureScot guidance for guillemot connectivity has been applied correctly, whereby a foraging range of 95.2 km has been applied (during both the breeding and non-breeding season) which in this instance means Bellrock falls outside this range.	Noted. SPA breeding guillemot populations were concluded to have no connectivity with the Bellrock WFDA and were not taken forward to the Phase Two HRA assessment. For details see: ▪ Section 2; and ▪ Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV). Also, an assessment on the regional guillemot population is undertaken in the Chapter 10: Offshore Ornithology (Volume II).

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Minutes from Bellrock WFDA Collision Risk Modelling Workshop held on 29 October 2024	Meeting Minutes - NatureScot provided feedback on terminology alignment, supported the use of updated SNCB avoidance rates for collision risk modelling, and advised that any deviations from guidance be clearly stated in the Bellrock WFDA EIA Report. A 22 m air gap proposed by the Applicant was noted by NatureScot as consistent with expectations, and the Bellrock WFDA consent application is expected in Q4 2025.	CRM for the Bellrock WFDA has been undertaken using the new avoidance rates included within the SNCB joint guidance note rather than the avoidance rates agreed with NatureScot on 19 July 2024. For further detail, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); ▪ Section 4.4; and ▪ Chapter 10: Offshore Ornithology (Volume II).
NatureScot	Email from NatureScot to the Applicant on 10 December 2024	The meetings minutes from the meeting held 29 October 2024 include a post meeting note highlighting that Bellrock have since decided to undertake CRM using the avoidance rates included within the SNCB joint guidance note. NatureScot welcome and are content with this approach.	Noted. For further detail, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV).
NatureScot	Email from the Applicant to NatureScot on 27 January 2025	The Applicant noted at the Offshore Wind Conference in Glasgow (January 2025) that the 'testing' phase of the CEF will take place in summer 2025. Therefore, the Bellrock Project will use the Interim CEF in-combination/cumulative totals of seabirds in the application as the CEF will not be available in time for the Bellrock project to use. NatureScot are content that the NEEOG led cumulative work packages are used by Bellrock to inform cumulative/in-combination assessments, should the Scottish Government led CEF tool not be available. The Applicant expect these packages, if used, to be included in the EIA Report as appendices.	In accordance with NatureScot advice, as the CEF was not available at the time of the assessment, the cumulative and in-combination mortalities for displacement and collision impacts were taken from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). For further detail, see: ▪ Section 3.4; ▪ Section 4.4; and ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV).
NatureScot	Email from the Applicant to NatureScot on 27 January 2025	The Applicant believe the current NatureScot position is to run cumulative and in-combination PVA both with Berwick Bank included and excluded. This comes close to doubling the number of PVAs required and adds to the	See response below to email from NatureScot to the Applicant on 7 February 2025.

Consultee	Document/Date	Comment	How/Where Comment is Addressed
		amount of interpretation required for the RIAA and in some sections of the EIA. The Applicant requested confirmation from NatureScot that this is still their position. Further to the above, and in-line with recent advice that the Applicant have issued in response to queries from other developers regarding PVA analysis, the Applicant's current advice is that where Green Volt is considered to have AEoSI and compensation has been agreed as per the consent, then this is not required as part of the in-combination. However, all other impacts that are not compensated should still be included.	
NatureScot	Email from NatureScot to the Applicant on 7 February 2025	NatureScot are content that the Northeast and East Ornithology Group (NEEOG) led cumulative work packages are used by Bellrock to inform cumulative/in-combination assessments, should the Scottish Government led CEF tool not be available. NatureScot expect these packages, if used, to be included in the Bellrock WFDA EIA Report as appendices. NatureScot confirm that it is still their current advice position to run cumulative and in-combination both with Berwick Bank included and excluded. Further to the above, and in-line with recent advice that NatureScot have issued in response to queries from other developers regarding PVA analysis, the current advice is that where Green Volt is considered to have AEoSI and compensation has been agreed as per the consent, then this is not required as part of the in-combination. However, all other impacts that are not compensated should still be included.	At the time of writing, the Scottish Government led CEF tool is not yet available and, therefore, the assessments for cumulative and in-combination displacement and collision impacts rely on the mortalities for the other plans and projects as determined from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). Details of these totals and their derivation are provided in Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV). Subsequent to this advice from NatureScot, the Berwick Bank Wind Farm has been consented, with the consent requiring that compensation be provided for those SPA populations on which the potential for an adverse effect was concluded (Marine Directorate 2025a,b). However, the NatureScot advice on this matter remains unchanged, as confirmed in email from NatureScot of 1 September 2025. The in-combination assessments undertaken in this report consider the impacts for scenarios with the Berwick Bank Wind Farm included and excluded. For the collision and displacement effects during the O&M phase, the outputs from both scenarios are presented for each SPA population which is assessed. However, the interpretation and conclusions focus on the 'Berwick Bank excluded' scenario for SPA populations for which

Consultee	Document/Date	Comment	How/Where Comment is Addressed
			the potential for an adverse effect from Berwick Bank was concluded and on the 'Berwick Bank included' scenario for SPA populations for which no adverse effect from Berwick Bank was concluded. This is on the basis that compensation will be provided for those SPA populations for which the potential for an adverse effect was concluded. Similarly (and in accordance with this advice from NatureScot), the impacts from the Green Volt wind farm are excluded for those SPA populations on which the potential for an adverse effect from Green Volt was concluded. Impacts from Green Volt are included in all other cases. For further details on the in-combination and cumulative PVAs, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Section 4.4.
NatureScot	Email from NatureScot to the Applicant on 23 May 2025	Regarding the PVA requirements and Guidance Note 11, NatureScot are in the process of reviewing and updating Guidance Note 11. The requirement for modelling of the 'operational life' and 50-years will remain, the 50-year time period gives the opportunity to consider recovery in the populations once the wind farm has stopped operating. As such, NatureScot will require PVAs to model the 'operational life' (35 years in this instance) and 50 years. The proposed analysis will account for operational impacts ending at year 35, and from year 35 to year 50 ongoing wind turbine impacts will not be assessed as the turbines are to be removed. NatureScot are content that this correctly accounts for the operational impact and can accept the approach that Bellrock set out in email of 12 May 2025 (i.e. under the 50-year scenario, ending impact at year 35, and including the recovery period between year 35 and 50).	The PVAs have been undertaken to cover the 35-year operational period (defined as the time between the Commercial Operations Date and the first turbine being decommissioned) and a subsequent 15-year recovery period without wind farm effects (i.e. a total of 50 years), in accordance with NatureScot advice. Outputs are presented for (i) the 35-year projection period (representing the end of the operational period) and (ii) the full 50 year projection period. For further details, see: ▪ Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV); and ▪ Section 4.4.

Consultee	Document/Date	Comment	How/Where Comment is Addressed
NatureScot	Email from NatureScot to the Applicant on 1 September 2025	From NatureScot's perspective this is fine. Whilst we are content that you continue in-line with our advice (as noted below), we do also recommend that you seek confirmation from MD-LOT as well.	Advice received from NatureScot in response to email of 28 August 2025 from the Applicant, stating that following the consent decision for the Berwick Bank Wind Farm, the Applicant's preference was to continue to follow the advice in email from NatureScot of 7 February 2025 of including both the with and without Berwick Bank impacts within the cumulative and in-combination impacts. This was because of the advanced stage of the assessments at this point in time. MD-LOT confirmed agreement with this approach on 17 December 2025. As detailed above, the NatureScot advice on this matter from 7 February 2025 has been followed.
NatureScot	Email from NatureScot to the Applicant on 10 December 2024	The meetings minutes from the meeting held 29 October 2024 include a post meeting note highlighting that Bellrock have since decided to undertake CRM using the avoidance rates included within the SNCB joint guidance note. NatureScot welcome and are content with this approach.	Noted. For further details, see: ▪ Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV); and ▪ Section 4.4.
MD-LOT	Email from MD-LOT to the Applicant on 18 December 2025	MD-LOT is content with the approach to proceed with and without Berwick Bank for the cumulative and in-combination assessments.	As detailed above, this advice has been followed.

This page is intentionally blank

2 Summary and Update of HRA Screening Conclusions

2.1 Summary of the HRA Screening Report Conclusions

5. The **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** identified a total of 46 SPAs for which there was considered to be the potential for a Likely Significant Effect (LSE) in relation to the Bellrock WFDA. These 46 SPAs comprised:
 - 36 which were included solely on the basis of breeding seabird colony qualifying features;
 - Eight which were included solely on the basis of migratory non-seabird qualifying features;
 - One which was included on the basis of both breeding seabird colony and migratory non-seabird qualifying features; and
 - One marine Special Protection Area (SPA) (which provides supporting habitat for a range of breeding and non-breeding seabird and waterbird qualifying features).
6. These 46 SPAs are listed out in Table 8.1 of the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** along with the individual qualifying features for which the potential for LSE was identified in each case.
7. The HRA screening exercise undertaken for the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** was based upon the data from the first year of the baseline Digital Aerial Survey (DAS) programme only, which meant that some of the conclusions had to be made on a provisional basis (subject to the findings from the second year of the baseline DAS data). This concerned species which are qualifying features (or named components of seabird assemblage qualifying features) of the breeding seabird colony SPAs and which, theoretically, had potential for connectivity with the Bellrock WFDA but which were either not recorded or (in one case) had a single record in the relevant seasonal period(s) during the first year of the DAS. Thus, the conclusions of the HRA screening exercise had to be reviewed with regard to the SPAs for which these species were qualifying features following completion of the analyses of the full two years of baseline DAS data.
8. In addition to the above it was also necessary to review the conclusions of the HRA screening exercise in relation to the NatureScot (2024) scoping advice, with the points relating to the HRA screening exercise included in **Table 1.1**.
9. The subsequent revisions to the conclusions of the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** are set out in **Section 2.2** below.

2.2 Updates and Revision to the HRA Screening Conclusions

2.2.1 Changes Following Incorporation of the Second Year of the Baseline DAS Data

2.2.1.1 Breeding Seabird Colony SPAs

2.2.1.1.1 *Seabird Species and Breeding Season Connectivity*

10. The **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** identified five seabird species which are qualifying features (or named components of seabird assemblage qualifying features) of breeding seabird colony SPAs and which, theoretically, have potential for breeding season connectivity with the Bellrock WFDA but which were not recorded during the breeding season months in the first year of the baseline DAS. These were lesser black-backed gull, Leach's storm petrel, European storm petrel, Manx shearwater and great skua. Of these, the HRA Screening exercise concluded (provisionally) that there was potential connectivity for lesser black-backed gull, European storm petrel and great skua, but not for the remaining two species, based upon consideration of the known ecology of the species and their at-sea distributions during the breeding season. In relation to European storm petrel, it was also noted that the theoretical potential for breeding season connectivity was identified in relation to a single SPA population only (Auskerry SPA) and, although the species is known to occur within the North Sea during the breeding season, densities are low compared to those in more northern and western United Kingdom (UK) waters (Stone et al. 1995, Kober et al. 2010, Waggitt et al. 2020). Thus, for both Leach's storm petrel and European storm petrel (which are species that may be under-recorded in DAS data due to their small size and dark colouration), the absence of breeding season records in the baseline DAS data is consistent with what is known about their ecology and at-sea distributions.
11. During the second year of the baseline DAS, there were also no breeding season records of any of these five species (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**). Therefore, the conclusions of potential connectivity during the breeding season for SPA populations of breeding lesser black-backed gull, European storm petrel and great skua were revised to conclusions of no potential connectivity. The conclusions of no potential connectivity during the breeding season for the remaining two species, Leach's storm petrel and Manx shearwater, were maintained.

2.2.1.1.2 *Breeding Seabird Colony SPAs and Non-breeding Season Connectivity*

12. The **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** identified 14 seabird species which are qualifying features (or named components of seabird assemblage qualifying features) of breeding seabird colony SPAs and which, theoretically, have potential for connectivity during the non-breeding periods with the Bellrock WFDA but which were either not recorded or (in the case of Arctic tern) had a single record during the non-breeding season months of the first year of the baseline DAS. These were red-throated diver, lesser black-backed gull, roseate tern, Sandwich tern, common tern, Arctic tern, little tern, Arctic skua, great skua, Manx shearwater, European storm petrel, Leach's storm petrel, shag and cormorant. Of these, the HRA Screening exercise concluded (provisionally) that there was potential connectivity for lesser black-

backed gull, Sandwich tern, common tern, Arctic tern, Arctic skua and great skua, but not for the remaining eight species, based upon consideration of the known ecology of the species and their at-sea distributions during the non-breeding periods.

13. During the non-breeding season months of the second year of the baseline DAS, there were no further records of any of these species except for a single record of red-throated diver in September and a single record of European storm petrel in October (with the latter being within the offshore aerial survey area (OASA), but outside the WFDA and 2 km buffer) (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**). Therefore, the conclusions of potential connectivity during the non-breeding periods for SPA populations of breeding lesser black-backed gull, Sandwich tern, common tern, Arctic tern, Arctic skua and great skua were revised to conclusions of no potential connectivity. The conclusions of no potential connectivity during the non-breeding periods for the remaining eight species were maintained (noting that, as for potential connectivity during the breeding season, for both Leach's storm petrel and European storm petrel the (near) absence of records in the baseline DAS data is consistent with what is known about their ecology and at-sea distributions).

2.2.1.1.3 Consequences for Conclusions of Likely Significant Effect

14. The updates to the conclusions on potential connectivity described above meant that the potential for LSE as concluded in the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** was revised to a conclusion of no LSE for the following SPAs:
 - Bowland Fells (potential for LSE based only on connectivity for lesser black-backed gull during the non-breeding season);
 - Morecambe Bay and Duddon Estuary (potential for LSE based only on connectivity for lesser black-backed gull during the non-breeding season);
 - Ribble and Alt Estuaries (potential for LSE based only on connectivity for lesser black-backed gull during the non-breeding season);
 - Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro (potential for LSE based only on connectivity for lesser black-backed gull during the non-breeding season);
 - Foula (potential for LSE based only on connectivity for great skua and for Arctic skua during the non-breeding season);
 - Fetlar (potential for LSE based only on connectivity for great skua and for Arctic skua during the non-breeding season);
 - Handa (potential for LSE based only on connectivity for great skua);
 - Ronas Hill – North Roe and Tingon (potential for LSE based only on connectivity for great skua);
 - North Norfolk Coast (potential for LSE based only on connectivity for Sandwich tern during the non-breeding season);
 - Imperial Dock Lock (potential for LSE based only on connectivity for common tern during the non-breeding season);

- Auskerry (potential for LSE based only on connectivity for Arctic tern during the non-breeding season);
- Papa Stour (potential for LSE based only on connectivity for Arctic tern during the non-breeding season);
- Rousay (potential for LSE based only on connectivity for Arctic skua during the non-breeding season); and
- Papa Westray (North Hill and Holm) (potential for LSE based only on connectivity for Arctic skua during the non-breeding season).

15. Therefore, the above listed SPAs are not taken forward to the Phase Two assessment. In addition, the revisions to the conclusions on potential connectivity mean that the Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ythan Estuary and Meikle Loch Ramsar site is now included solely on the basis of the potential for LSE in relation to migratory non-seabird qualifying features. This is because Sandwich tern was the only breeding seabird qualifying feature for which the potential for LSE had been identified in relation to this designated site.

2.2.1.2 NatureScot Advice

16. NatureScot (2024) advised that with respect to nocturnal species, the potential impacts from lighting should be considered because these species may be attracted to and/or disorientated by artificial light sources. The potential for such effects has been considered but following the revisions to the conclusions on potential connectivity (detailed above) no potential connectivity is identified between SPA populations of nocturnal species (i.e. Manx shearwater, European storm petrel and Leach's storm petrel) and the Bellrock WFDA. As such, this effect pathway has not been considered in the Phase Two assessment.
17. NatureScot (2024) also advised that with respect to the potential for disturbance and displacement impacts from vessel movements between the Bellrock WFDA and ports during construction, O&M and decommissioning ports, consideration of further marine SPAs may be required in addition to those identified in the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**. Therefore, on a precautionary basis, the potential for LSE due to potential disturbance and displacement effects is now also identified in relation to the Moray Firth SPA during the construction, O&M and decommissioning phases and the Scapa Flow SPA during the construction phase because of the possibility that vessels may use ports in and around the Moray Firth during all phases and at Scapa in Orkney during construction.

2.2.1.3 Other Considerations

18. The work undertaken in the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** erroneously identified kittiwake as a named component of the seabird assemblage feature of the Coquet Island SPA. Therefore, the Coquet island SPA kittiwake population is not considered in the Phase Two assessment.

2.3 Conclusions on the Potential for Likely Significant Effects

19. Following the revisions and updates detailed above, the potential for LSE is concluded in relation to a total of 34 SPAs, which comprise 22 breeding seabird colony SPAs, nine migratory non-seabird SPAs (and Ramsar sites) and three marine SPAs. These SPAs are detailed in **Table 2.1** below, along with the qualifying features (or named components of the assemblage features) for which LSE is identified in each case and the effect pathways for which they are being assessed.

This page is intentionally blank

Table 2.1: Summary of European Sites and Relevant Qualifying Features for Which Potential LSEs have been Identified and Screened in for Further Assessment in the RIAA

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Breeding Seabird Colony Special Protection Areas						
Buchan Ness to Collieston Coast SPA	113.4	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Fowlsheugh SPA	121.7	Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
St Abb's Head to Fast Castle SPA	154.1	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Farne Islands SPA	154.1	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Puffin (breeding) ²	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
Forth Islands SPA	157.8	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Puffin (breeding) ²	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Troup, Pennan and Lion's Heads SPA	159.0	Kittiwake (breeding)	Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Secondary entanglement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
Coquet Island SPA	181.7	Puffin (breeding) ²	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Secondary entanglement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
East Caithness Cliffs SPA	237.9	Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Great black-backed gull (breeding) ³	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
North Caithness Cliffs SPA	251.9	Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Puffin (breeding) ²	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
Copinsay SPA	263.6	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase				
				C	O&M	D		
		Great black-backed gull (breeding) ³	Collision		✓			
			Changes in prey availability	✓	✓	✓		
			In-combination effects	✓	✓	✓		
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓		
			Collision		✓			
			Barrier to movement		✓			
			Changes in prey availability	✓	✓	✓		
			In-combination effects	✓	✓	✓		
		Flamborough and Filey Coast SPA	280.2	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
					Collision		✓	
Barrier to movement					✓			
Changes in prey availability	✓				✓	✓		
In-combination effects	✓				✓	✓		
Razorbill (breeding) ³	Disturbance and displacement			✓	✓	✓		
	Barrier to movement				✓			
	Changes in prey availability			✓	✓	✓		
	Secondary entanglement				✓			
	In-combination effects			✓	✓	✓		
Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓				

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
Hoy SPA	281.7	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
Fair Isle SPA	299.5	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Calf of Eday SPA	318.0	Great black-backed gull (breeding) ³	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
West Westray SPA	330.0	Kittiwake (breeding) ³	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Sule Skerry and Sule Stack SPA	359.2	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Noss SPA	360.6	Gannet (breeding)	Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓
		Seabird assemblage (breeding)	Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓
North Rona and Sula Sgeir SPA	442.3	Gannet (breeding)	Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Hermaness, Saxa Vord and Valla Field SPA	455.7	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
St Kilda SPA	614.0	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding)	In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Mingulay and Berneray SPA	639.4	Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Secondary entanglement		✓	
			In-combination effects	✓	✓	✓
Rathlin Island SPA	782.7	Razorbill (breeding) ³	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase			
				C	O&M	D	
				Secondary entanglement		✓	
				In-combination effects	✓	✓	✓
	Seabird assemblage (breeding)	Disturbance and displacement	✓	✓	✓		
		Barrier to movement		✓			
		Changes in prey availability	✓	✓	✓		
		Secondary entanglement		✓			
		In-combination effects	✓	✓	✓		
Marine SPAs							
Outer Firth of Forth and St Andrew's Bay Complex SPA	116.9	Red-throated diver (non-breeding)	Disturbance/displacement	✓	✓	✓	
			Collision		✓		
			Barrier to movement		✓		
			In-combination effects	✓	✓	✓	
		Slavonian grebe (non-breeding)	Disturbance/displacement	✓	✓	✓	
			Collision		✓		
			Barrier to movement		✓		
			In-combination effects	✓	✓	✓	
		Common eider (non-breeding)	Disturbance/displacement	✓	✓	✓	
			Collision		✓		
			Barrier to movement		✓		

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
		Long-tailed duck (non-breeding)	Disturbance/displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		Common scoter (non-breeding)	Disturbance/displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		Velvet scoter (non-breeding)	Disturbance/displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		Common goldeneye (non-breeding)	Disturbance/displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		Red-breasted merganser (non-breeding)	Disturbance by vessel movements	✓	✓	✓
			Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		European shag (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		European shag (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Northern gannet (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Atlantic puffin (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Guillemot (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Guillemot (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Razorbill (non-breeding)	Disturbance/displacement	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Little gull (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Black-headed gull (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Common gull (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Red-throated diver (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
Moray Firth SPA	185.4	Great northern diver (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Slavonian grebe (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Little gull (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Common eider (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Long-tailed duck (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓
		Red-throated diver (non-breeding)	In-combination effects	✓	✓	✓
			Disturbance/displacement	✓	✓	✓

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Common scoter (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Velvet scoter (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Common goldeneye (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		Red-breasted merganser (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		European shag (breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
		European shag (non-breeding)	Disturbance/displacement	✓	✓	✓
			In-combination effects	✓	✓	✓
Scapa Flow SPA	318.2	Great northern diver (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
		Black-throated diver (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
		Red-throated diver (breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
		Slavonian grebe (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Common eider (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
		Long-tailed duck (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
		Red-breasted merganser (non-breeding)	Disturbance/displacement	✓		
			In-combination effects	✓		
European shag (non-breeding)	Disturbance/displacement	✓				
	In-combination effects	✓				
Migratory Non-Seabird Sites (Estuarine)						
Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Ythan Estuary and Meikle Loch Ramsar site	114.9	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Lapwing (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Loch of Strathbeg SPA and Ramsar site	128.7	Barnacle goose (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Greylag goose (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Pink-footed goose (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Whooper swan (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Eurasian teal (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Common goldeneye (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Montrose Basin SPA and Ramsar site	141.4	Greylag goose (non-breeding)	Collision		✓	
			Changes in prey availability		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Shelduck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Firth of Forth SPA and Ramsar site	158.9	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Golden plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Pink-footed goose (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Red-throated diver (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Redshank (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Sandwich tern (passage)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Shelduck (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Slavonian grebe (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Turnstone (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Great crested grebe (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Curlew (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Long-tailed duck (non-breeding)	Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Common scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Velvet scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Ringed plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Grey plover (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Dunlin (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Mallard (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Lapwing (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Wigeon (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Waterfowl assemblage (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Firth of Tay and Eden Estuary SPA and Ramsar site	159.6	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Black-tailed godwit islandica (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goosander (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Grey plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Long-tailed duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
		Oystercatcher (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Red-breasted merganser (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Sanderling (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Shelduck (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Velvet scoter (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	
		Waterfowl assemblage (non-breeding)	In-combination effects		✓	
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Migratory Non-Seabird Sites (Inland Waterbodies)						
Loch of Skene SPA and Ramsar site	135.3	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goosander (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Loch Leven SPA and Ramsar site	205.8	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Shoveler (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Whooper swan (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Gadwall (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pochard (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Teal (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Tufted duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
South Tayside Goose Roosts SPA and Ramsar site	213.8	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
River Spey – Insh Marshes SPA and Ramsar site	228.3	Hen harrier (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Whooper swan (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Edge By-sea Distance to Wind Farm Development Area (km)	Relevant Qualifying Features ¹	Effect Pathway	Project Phase		
				C	O&M	D
Notes: ✓ = Potential for LSE during Project Phase. C = Construction; O&M = Operation and Maintenance; D = Decommissioning. ¹ The Assemblage qualifying feature of a site is screened in if a qualifying feature corresponding to the assemblage type (e.g. seabird, waterfowl), or a named component species of the assemblage, is screened in for further assessment in the RIAA on the basis that LSE cannot be ruled out. ² Breeding seabird qualifying features which are included on the basis of potential connectivity during the breeding season only. ³ Breeding seabird qualifying features which are included on the basis of potential connectivity during the non-breeding season only.						

This page is intentionally blank

3 Information to Inform Appropriate Assessment

20. As described in **Section 2**, a European Site is progressed to the Appropriate Assessment stage (Phase Two of the HRA process, see Section 2.3 in **RIAA Part 1 (Volume VI)**) where it is not possible to exclude LSE on one or more of its qualifying features in view of the site's conservation objectives. European Sites, features and potential impacts requiring Appropriate Assessment for the WFDA are therefore those for which LSE could not be ruled out during the Screening exercise for following consultation.
21. Information to help inform the Appropriate Assessment for SPAs (and Ramsar sites) is provided in **Sections 3.1 to 3.4**. The information provided includes a description of the SPAs (and Ramsar sites) under consideration, their qualifying features, and an assessment of the implications of the WFDA for the site in view of the conservation objectives of each site and considering any adverse effect on site integrity.

3.1 Realistic Worst-case Scenario

22. The final design of the Bellrock Wind Farm Infrastructure will be confirmed during detailed design, post-consent. To undertake a robust and precautionary assessment, the realistic worst-case design scenario has been defined. Realistic worst-case scenarios (WCS) (i.e. those that cause the greatest impact) are derived from the project design envelope to ensure that all other design scenarios would have equal or less impact. Please see **Chapter 5: EIA Methodology (Volume II)** for further details on the project design envelope approach. Assessments for all designated European Sites considered in this part of the RIAA are based on the WCS. An overview of the WCS considered for assessment of potential impacts on ornithological receptors is detailed in **Table 3.1**.
23. The WCS is consistent with that used for the impact assessment in **Chapter 10: Offshore Ornithology (Volume II)** of the Bellrock WFDA EIA Report

This page is intentionally blank

Table 3.1: Overview of Realistic Worst-Case Design Scenario

Impact	Realistic Worst-case Design Scenario	Rationale
Construction		
Disturbance	General: - Based on the maximum extent of the proposed Bellrock WFDA (280 km²) and an assumption that disturbance may occur out to 2 km from the Bellrock WFDA, giving a total area of 457 km². - Indicative construction duration: site preparation works¹ to commence in 2030, construction to occur from 2031 to 2037 inclusive (8 years of activity for Bellrock Wind Farm Infrastructure). Vessel movements: - Maximum number of vessel round trips² for construction and site preparation vessels: 1,615; - Maximum number of vessels on site at one time: 34; and - Maximum number of helicopter round trips during construction: 816. Piling: - Number of piles for maximum 132 Floating Offshore Units (FOUs) = 1,188 (9 anchors per FOU x 132 FOUs); - Duration of anchor installation for single FOU = 3 days (3 piled anchors per 24 hours, for up to 9 anchors); - Concurrent piling at up to two FOU locations; - Maximum total active piling time per FOU (including soft-start and ramp-up): = 2.99 hours per pile, up to 8.97 hours piling per day; and - Total piling time for 132 FOUs = 3,552.12 hours. Inter-array cables (IACs): - Installation of up to 300 km of IACs, with burial of up to 225 km IACs with ploughing as the worst-case type; and Maximum length of unburied cable requiring protection: 26.2 km	The worst-case is based on the design envelope options that would result in the installation of the greatest amount of Wind Farm Infrastructure, the greatest number of vessels, over the longest construction period. This includes: - Installation of Wind Farm Infrastructure; and - Construction vessel movements and anchoring.

Impact	Realistic Worst-case Design Scenario	Rationale
Changes to prey availability	As detailed in Chapter 7: Benthic Ecology (Volume II) and Chapter 8: Fish and Shellfish Ecology (Volume II) the worst-case scenario for changes to prey availability are as follows: Physical disturbance and temporary habitat loss: - Total area of disturbance = 3,635,158 m² (3.64 km²) from the following sources: - Seabed preparation = 797,032 m² (from boulder clearance, sand wave levelling and slope levelling for gravity-based anchors (GBAs) only; and - Construction = 2,838,126 m² (from mooring lines (including pre-lay of mooring lines on the seabed), anchors, IAC's, subsea cable hubs and unexploded ordnance (UXO) Clearance). Increased suspended sediment concentrations (SSCs) and sediment re-deposition: Total volume of sediment = 1,394,530 m³ (0.0014 km³), from the following sources: - Seabed preparation = 793,032 m³ (from preparation for anchor installation (for GBA's only) and sand wave levelling prior to IAC installation); and - Construction = 601,498 m³ (from anchor installation, mooring buoy installation, jet trenching IAC installation and subsea cable hub installation). Underwater noise from piling: - Maximum number of piles (9 anchors x 132 WTGs) = 1,188; - Concurrent piling at up to two FOU locations; - Total active piling duration = 3,552.12 hours; - Maximum piling days = 1,188; and - Maximum FOU piles installed within 24 hours = 6. Underwater noise from vessels: - Maximum number of vessels on site at any one time = 34; and - Maximum number of round trips = 1,615.	The worst-case scenario for changes to prey availability for birds is based on the worst-case scenario table (Table 8.3) and conclusions of the assessments presented in Chapter 8: Fish and Shellfish Ecology (Volume II): - Physical disturbance and temporary habitat loss; - Increased suspended sediment concentrations (SSCs) and sediment re-deposition; - Underwater noise and vibration; and - Changes in fishing activity.
Displacement	As for disturbance and changes to prey availability above.	

Impact	Realistic Worst-case Design Scenario	Rationale
Operation and Maintenance		
Disturbance	Vessel movements - Maximum number of round trips for O&M vessels: 211 per year; - Maximum number of vessels on site at one time during O&M: 21; and - Maximum number of helicopter round trips during O&M: 986 per year (assuming 10% weather days and an average of three trips per day).	The greatest number of vessels, over the operational period, considering maintenance and repair vessel activity and anchoring.
Changes to prey availability	As detailed in Chapter 8: Fish and Shellfish Ecology (Volume II) the worst-case scenario for changes to prey availability are as follows: Physical disturbance and temporary habitat loss: - Worst-case O&M disturbance footprint for the Bellrock WFDA (total over the lifetime of the Project) = 47.46 km² (from moorings, IAC's and jack-up vessels); Removal and subsequent deposit of marine growth; The removal of marine growth is not quantified within the WCS, as the volume of material that may require removal is highly uncertain and would be dependent on a range of operational and environmental factors, including the nature of the infrastructure, location within the water column, and maintenance requirements; and - MD-LOT considers the deposit of marine growth to be a licensable activity under Section 21 of the Marine (Scotland) Act 2010 and Section 66 of the Marine and Coastal Access Act 2009. Accordingly, the potential effects associated with the removal and deposit of marine growth are considered qualitatively within this assessment, and no quantitative estimate of volumes is provided at this stage. Increased suspended sediment concentrations (SSCs) and sediment re-deposition: IAC Repair due to Failure: - Maximum sediment disturbed per year due to IAC repair = 69,300 m³; and - Maximum sediment disturbed across the operational life of the Bellrock Wind Farm Infrastructure = 2,425,500 m³. Catenary Mooring Lines:	Indirect effects on birds could occur through changes to the habitats and species considered within Chapter 7: Benthic Ecology (Volume II) and Chapter 8: Fish and Shellfish Ecology (Volume II) .

Impact	Realistic Worst-case Design Scenario	Rationale
	- Maximum volume of sediment disturbed within the swept area of the catenary mooring lines = 46,200,000 m³. Underwater noise from operational turbines: - WTG parameters (diameter, number etc) as outlined above for construction; and - Operational life of the Bellrock WFDA: 35 years. Underwater noise from maintenance activities (cable repair, replacement and reburial and cable protection works): - Worst-case cable failure rate per year = 1.8; and - Worst-case length of cable reburial per year = 21,000 m. Underwater noise from vessels: - Maximum number of vessels on site at any one time = 21; and - Maximum number of vessel round trips per year = 211. Permanent habitat loss: Total Area of permanent habitat loss = 2,926,659 m² (2.93 km²) (from anchors, mooring buoys, subsea cable hubs, IAC protection, IAC cable crossings, scour protection for anchors, metocean buoys). Electromagnetic Fields (EMFs): Presence of IACs: - Maximum length of 300 km of 132 kV (maximum) high voltage alternating current IACs, with up to 225 km buried (with up to 26.2 km potentially requiring cable protection) and up to 92.4 km of dynamic IAC sections³; and - Target burial depth of 0.5 to 2.5 m (subject to cable burial risk assessment). Cable protection: - Maximum amount of IAC requiring external cable protection = 26.2 km. Cable crossings: - Maximum number of cable crossings = 3; and	

Impact	Realistic Worst-case Design Scenario	Rationale
	- Maximum length of cable crossings = 157.2 m (53.6 m per crossing). Subsea cable hubs: - Maximum number of subsea cable hubs = 18.	
Secondary entanglement with subsea infrastructure	Mooring lines: - Maximum number of mooring lines = 1,188 for 132 FOU's (up to 9 mooring lines per FOU); - Maximum mooring touchdown distance from FOU = 1,300 m; - Maximum mooring radius for each FOU = 1,300 m; - Maximum length of each mooring line within the water column during normal operation = 920 m; and - Maximum length of each mooring line on the seabed during normal operation = 770 m.	Infrastructure which may result in secondary entanglement includes mooring lines and IACs.
Displacement	Based on the maximum extent of the proposed Bellrock WFDA (280 km²) and an assumption that displacement may occur out to 2 km from the Bellrock WFDA, giving a total area of 457 km² .	
Barrier to movement	As above for displacement during O&M.	
Collisions with WTGs	The Bellrock WFDA and turbine parameters: - Operational life of 35 years; - Up to 132 WTGs; - Minimum air gap of 22 m above all tidal levels; - Maximum rotor diameter: 300 m; and - WTGs deployed across the full WFDA.	Collision risk modelling shows that 132 x 15 MW WTGs (Turbine Type 1) have the largest theoretical collision impact risk for all species considered compared to 90 x 22 MW WTGs (Turbine Type 2) also modelled (see Appendix 10.2: Offshore Ornithology Collision Risk Modelling Report (Volume IV)).

Impact	Realistic Worst-case Design Scenario	Rationale
Decommissioning		
Disturbance	Vessels used for a range of decommissioning activities such as removal of Station keeping systems (SKS), cables and cable protection. Vessels assumed to be similar to vessel activity described for construction phase (Impact C1). The sequence of decommissioning is likely to be the reverse of the construction sequence, and similar types and numbers of vessels and equipment are expected to be involved. In general, it is expected that all structures above the seabed will be fully removed at the end of Bellrock WFDA's operational lifetime. Legislation, guidance and good practice will be kept under review throughout the lifetime of the Bellrock WFDA and will be followed at the time of decommissioning. The removal and dismantling of the WTGs and FSS will largely be a reversal of the installation process. Subsea cable hubs are also expected to be fully removed from above the seabed. The dynamic sections of the IACs within the water column will be fully removed and cut at the seabed. Mooring lines will be fully removed, and anchors are expected to be either fully removed or cut off at or below seabed level. Where static IACs remain buried these may be cut and left in-situ.	The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time. For the purposes of the worst-case scenario, it is anticipated that the impacts would be comparable to those identified for the construction phase.
Displacement	As for disturbance during the decommissioning phase.	
Changes to prey availability	Decommissioning Overview: The sequence of decommissioning is likely to be the reverse of the construction sequence, taking around seven years, with similar types and numbers of vessels and equipment expected to be involved. It is expected that the Bellrock Wind Farm Infrastructure will be fully removed at the end of its operational life. The removal and dismantling of the FOU's will largely be a reversal of the installation process. Generally, the FOU's will be towed from the Bellrock WFDA to a suitable port for decommissioning. Mooring lines and anchors will be recovered and removed from the WFDA. For FOU driven pile anchors, these are expected to be either fully removed or cut off below seabed level with a	

Impact	Realistic Worst-case Design Scenario	Rationale
	proportion remaining in-situ (due to anticipated excessive cost in their complete removal) following good practice and consideration of environmental conditions and sensitivities. Subsea cable hubs are expected to be fully removed from the seabed. The dynamic sections of the IACs within the water column will be cut at the connector with the static IAC and fully removed. The approach for decommissioning the static IACs on the seabed is yet to be determined, however, this will be reviewed throughout the lifetime of the Bellrock WFDA and good practice guidance at time of decommissioning will be followed. Subject to the material used and environmental sensitivities, it may be preferable to leave scour protection in-situ to preserve the marine habitat that may have developed over the life of the Bellrock WFDA. The approach for decommissioning cable protection will be similar to scour protection. Relevant stakeholders and regulators will be consulted to establish the best approach. Good practice guidance at time of decommissioning will be followed.	
Notes: ¹ Site preparation works will commence up to one year before commencement of construction (year 0), at which point they may continue albeit as construction works (rather than site preparation works) these activities have been considered in the assessments of this document, for completeness. ² One round trip comprises two movements (i.e. one to and one from the Bellrock WFDA). ³ The maximum IAC length is 300 km; however, the maximum values presented for buried IAC (225 km, including up to 26.2 km with cable protection) and dynamic IAC (92.4 km) represent individual worst-case parameters and would not occur simultaneously. Accordingly, these values do not sum to the total IAC length.		

This page is intentionally blank

3.2 Baseline Information

24. Baseline information for European Sites (i.e. SPAs and Ramsar sites) identified for further assessment within the HRA Phase Two Appropriate Assessment has been collated through site-specific surveys, in addition to a comprehensive desktop study of existing studies and datasets.
25. Baseline information is presented in detail in **Chapter 10: Offshore Ornithology (Volume II)** and associated technical appendices, which have been derived from analyses of the baseline survey data. These key data sources are:
- **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV);**
 - **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV);**
 - **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV);**
 - **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV);**
 - **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV);** and
 - **Appendix 10.6: Bird Species List (Volume IV).**
26. Any additional sources of information used in the HRA Phase Two Appropriate Assessment are summarised within Section 4 of the **RIAA Part 1: Introductory Chapters (Volume VI)**.

3.3 Conservation Objectives and Conservation Advice

27. Conservation objectives set the framework for establishing appropriate conservation measures for each feature of a site and provide a framework against which plans or projects can be assessed. The conservation objectives set out the essential elements needed to ensure that the favourable condition status (FCS) of a qualifying habitat or species is maintained or restored at a site. If all the conservation objectives are met, then the integrity of the site will be maintained.
28. For European Sites under the statutory remit of NatureScot, Conservation and Management Advice documents (CMAs) have been produced for all marine SPAs. These documents contain revised and updated conservation objectives for the features of each site, site-specific clarifications and advice in order for the conservation objectives to be achieved, and advice on management required to achieve the conservation objectives. Each objective includes site-specific supplementary advice.
29. For European Sites under the statutory remit of Natural England, Supplementary Advice to the Conservation Objectives (SACOs) has been produced for some SPAs, which provide site-specific attributes and targets specific to the features of the site.

30. Where Ramsar interests coincide with qualifying features within an SPA, the advice for overlapping designations is considered to be sufficient to support the management of the Ramsar interests. Therefore, the conservation objectives are referenced for both designations.
31. Summary details on each of the designated sites that have been taken forward to the Phase Two HRA assessment are provided at the start of the section in which the assessment for that designated site is presented or, in the case of the migratory non-seabird SPAs, in **Appendix A: European Site Information and Conservation Objectives: Migratory Non-seabird SPAs (RIAA Part 3, Volume VI)**.

3.4 Approach to the In-combination Assessments

32. The in-combination assessment considers the potential for an Adverse Effect on Site Integrity for those SPAs taken forward to the Phase Two HRA assessment (and for which there is the potential for meaningful effects from the Wind Farm Infrastructure alone) from the activities and infrastructure associated with the Bellrock Wind Farm Infrastructure in-combination with other relevant plans, projects and activities. Having first determined that there is considered to be the potential for a meaningful impact from the project alone for a particular effect pathway, the general approach to the in-combination assessment for ornithology includes identifying potential in-combination effects, identifying a short list of plans and projects for consideration and assessing the impact of the in-combination effects. Assessment of both the displacement/barrier effects and collision risk effect pathways during the O&M phase on qualifying features of breeding seabird colony SPAs is undertaken on the basis of quantitative approaches (see **Section 4.1** and **Section 4.4**).
33. For the in-combination assessment, such quantitative approaches require a lengthy period for the collation and subsequent analysis and modelling of substantive data pertaining to the relevant plans and projects, entailing several months of advance work to enable this part of the assessment. Consequently, a cut-off date was set at the end of March 2025 for inclusion of plans and projects in this part of the in-combination assessment. This also coincided with the timing of the production of the most recent update (i.e. April 2025) of the North East and East Ornithology Group (NEEOG) Interim Cumulative Effects Framework (CEF) project totals, which NatureScot agreed should be used to inform the in-combination assessment (**Table 1.1**). However, it is recognised that there will have been some changes to the predicted in-combination mortalities from the other plans and projects in the period between this cut-off date and the submission of this assessment for the Bellrock WFDA (e.g. due to the submission of other projects during this period that may have potential effects on SPA populations considered in the Phase Two assessment for the Bellrock WFDA). To address this, a comparison of the estimated changes that have occurred in the in-combination mortalities between the end of March 2025 and the end of February 2026 has been undertaken in **Appendix B: In-Combination Assessment Update (RIAA Part 3, Volume VI)**, with the implications of these changes for the conclusions of the Phase Two assessment considered (see also **Section 5**). Given that assessments have been carried out on the basis of worst-case design scenarios, it is noted that for many of the projects included in the collated totals, the designs that are eventually (or have already been) built may be associated with lower predicted mortalities from displacement/barrier effects and, particularly, collisions than those on which these

totals are derived, and so the assessment is considered worst-case (i.e. precautionary) in this respect. For other impact pathways (which are assessed mainly, or entirely, using qualitative approaches) the cut-off for the inclusion of other plans and projects in the in-combination assessment was set at 1st October 2025.

34. The selection of plans and projects which are relevant to the in-combination assessment is based upon the results of the screening exercise detailed in **Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)**, with the final suite of plans and projects that are included being a subset of those identified in Table 1.4 of **Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)**. This subset is focussed on offshore wind farms (OWFs) located on the eastern seaboard of the UK, whilst the specific plans and projects that contribute to the in-combination varies between SPAs and SPA qualifying features according to which plans and projects are deemed to (or have been identified as having) potential impacts on the relevant qualifying feature. This, in turn, is determined mainly by the breeding season foraging ranges of the qualifying features, as well as the passage routes and wintering areas used during the non-breeding periods (e.g. NatureScot, 2023a, Furness, 2015, Woodward et al. 2019).
35. The plans and projects for in-combination assessment were also considered in relation to the three tiers set out in **Chapter 5: EIA Methodology (Volume II)**, i.e.:
- **Tier 1 assessment:** The Bellrock WFDA plus plans/projects which are operational, under construction, those with consent or a consent application submitted but not yet determined, plus the Bellrock OfTDA and Bellrock OnTDA;
 - **Tier 2 assessment:** The Bellrock WFDA plus all plans/projects assessed under Tier 1, plus projects with a Scoping Report and/or Scoping Opinion; and
 - **Tier 3 assessment:** The Bellrock WFDA plus all plans/projects assessed under Tier 1 and Tier 2, plus those projects likely to come forward where a Crown Estate Scotland Option to Lease Agreement or equivalent has been granted.
36. The assessments undertaken for the Bellrock Wind Farm Infrastructure alone determined that there was potential for in-combination effects (and hence a requirement for an in-combination assessment) in relation to the breeding seabird colony SPAs only (**Section 4.4**) and not in relation to the three marine SPAs (**Section 4.3**) or the migratory non-seabird SPAs (and Ramsar sites) (**Section 4.5**). Furthermore, for the breeding seabird colony SPAs, the potential for in-combination effects was limited to the displacement/barrier effect and collision risk effect pathways during the O&M phase. Therefore, the in-combination assessments relate only to those plans and projects for which predicted mortalities from the displacement/barrier effects and collision risk effect pathways are available (enabling a quantitative approach), with this encompassed by the Tier 1 assessment, as defined above. While it is possible that future projects (i.e. Tiers 2 and 3) may contribute additional mortality from displacement/barrier effects and collisions to the in-combination impact, there is no publicly available data for those projects at the time of writing, that can be used to contribute to the quantification of the in-combination effects and it is not possible to include them within this assessment. Therefore, it will be for those projects to consider such effects once their potential impacts have been quantified.

37. The fact that the in-combination assessment is limited to the effect pathways detailed above also means that the data used to inform the assessment derive from the April 2025 update of the NEEOG Interim CEF (as outlined above and as agreed by NatureScot (**Table 1.1**)). The details of these data and the approach and methods used for their collation are presented in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.
38. The Bellrock OfTDA and Bellrock OnTDA are also included within the Tier 1 assessment and require consideration in relation to the in-combination assessment because they represent the other two development areas (in addition to the Bellrock WFDA) for the Bellrock Project and are an essential requirement for the function of the Bellrock Wind Farm Infrastructure. Although the site selection process for the OfTDA and OnTDA is ongoing, there is a defined area of search for the OfTDA (see Figure 4.2 of the Bellrock WFDA EIA Report (**Volume III**)). On the basis of the OfTDA area of search (together with the fact that the OnTDA will not encroach on marine habitats), it is clear that there is no potential for in-combination effects to arise from the Bellrock WFDA with either the OfTDA or OnTDA in relation to the three marine SPAs because both the OfTDA and the OnTDA will be distant from these SPAs (and in the latter case will not affect marine habitats). There is also no potential for in-combination effects from the Bellrock WFDA with either the OfTDA or OnTDA on the migratory non-seabird SPAs (and Ramsar sites) because neither the OfTDA nor OnTDA have the potential to lead to collision or barrier effects during the O&M phase (these being the only two effect pathways screened in for these SPAs – **Table 2.1**).
39. Similarly, there is no potential for the OfTDA or the OnTDA to contribute to the in-combination collision effects on the breeding seabird colony SPAs during the O&M phase, for the same reason as given above in relation to the migratory non-seabird SPAs (and Ramsar sites). However, in relation to the breeding seabird colony SPAs, consideration needs to be given to other potential effects that would arise as a result of the OfTDA and how these would interact with, and contribute to, the potential effects from the Bellrock WFDA (noting that no potential effects on these SPAs are anticipated from the OnTDA because it will not encroach on marine habitats). This is considered to be most relevant to the construction and decommissioning phases, when the greatest levels of activity associated with the OfTDA are expected to occur and for which there will be temporal overlap with the construction phase of the Bellrock WFDA (the indicative construction programme for the Bellrock OfTDA is 2031 to 2036 (Section 4.12.1 in **Chapter 4: Project Description (Volume II)**) and the indicative construction programme for the Bellrock WFDA is 2031 to 2037 (Section 4.7.9 in **Chapter 4: Project Description (Volume II)**)).
40. At this stage, limited information is available on the scope and duration of construction activity associated with the Bellrock OfTDA (given the change to the grid connection solution imposed by the National Energy System Operator (NESO) in April 2025 (see Section 4.1.2 in **Chapter 4: Project Description (Volume II)**)). Therefore, the considerations on the potential for effects to arise from the Bellrock Wind Farm Infrastructure in-combination with the Offshore Transmission Infrastructure that are outlined below are an initial high-level assessment. Formal assessment of the impacts from the Offshore Transmission Infrastructure will be presented in the Bellrock OfTDA application documents which will include updated whole project and in-combination assessments.

41. Within the Bellrock WFDA, the key elements associated with the OfTDA during the construction phase would comprise the installation of the offshore export cables, interconnectors, offshore reactive compensation station(s) and up to six offshore substations (OfSSs)¹. These activities could lead to effects of disturbance, displacement and changes in prey availability on the SPA seabird populations which are broadly similar to those predicted to occur from the Bellrock WFDA during the construction phase (see **Section 4.4**). However, for the OfTDA, these activities will be even more localised in occurrence than for the Bellrock WFDA, of short duration at any one location and occur on a substantially smaller scale than the activities for the Bellrock WFDA during construction (e.g. with up to six offshore substations for the OfTDA compared to up to 132 wind turbine generators (WTGs) for the WFDA). Therefore, the scale of the potential effects that could arise from these elements of the OfTDA on SPA seabird populations is expected to be extremely small and would be unlikely to represent any meaningful addition to the scale of effects predicted due to the Bellrock WFDA alone during the construction phase.
42. In addition to the activities that would occur within the Bellrock WFDA during the construction phase, the OfTDA would also involve cable laying along the length of the cable corridor between the Bellrock WFDA and the point of landfall. This would occur within the area of search for the OfTDA (see Figure 4.2 of the Bellrock WFDA EIA Report (**Volume III**)), although the precise location of the cable corridor and landfall within this area of search remain to be determined. Based on previous assessments for such activities, it is again considered unlikely that the activities associated with cable laying and landfall would add in any meaningful way to the effects of the Bellrock WFDA alone on SPA seabird populations. However, given the area of search, it is possible that some of these activities may occur relatively close to the Fowlsheugh SPA and this could have implications for any conclusions relating to the qualifying features of this SPA. The current assessment is unable to exclude the potential for an Adverse Effect on Site Integrity for the Fowlsheugh SPA due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (**Section 4.4.2** and **Section 5**). This results from potential adverse effects on the Fowlsheugh SPA kittiwake and razorbill populations and, as such, in principle compensation has been proposed in relation to these populations in the **Bellrock WFDA Shadow HRA Derogation Case (Volume VI)**.
43. There is uncertainty about the detail and timing of decommissioning activities, but it would be expected that the type of activity and scale of effects would be broadly similar to, or less than, that during the construction phase. Thus, it is likely that the considerations outlined above in relation to the potential in-combination effects of the Bellrock WFDA with the OfTDA during the construction phase would also apply to the decommissioning phase. During O&M, activities associated with the OfTDA would be expected to be infrequent, highly localised in occurrence and of extremely small scale (e.g. occasional vessel movements along the cable corridor for maintenance works). Thus, the potential for any in-combination effects for the Bellrock WFDA and the OfTDA during the O&M phase is likely to be less than for the construction and decommissioning phases.

¹ Offshore substations will be consented as part of the OfTDA and will be assessed as part of the Bellrock OfTDA EIA Report. The OfTDA is also considered within the Bellrock WFDA EIA's cumulative effects assessments.

4 Assessment of Potential Adverse Effects on Integrity

4.1 Relevant Impact Pathways and Methods of Assessment

4.1.1 Construction and Decommissioning

4.1.1.1 Disturbance

44. For the purposes of the assessments of the breeding seabird colony SPAs disturbance and displacement are being considered as separate impact pathways, as set out in the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** (noting that there were no concerns in this regard in the NatureScot (2024) scoping advice). This is on the basis that disturbance effects may extend beyond those of displacement, particularly within the context of Wind Farm Development Areas where human activity and associated infrastructure may lead to displacement from the array area (whilst disturbance effects may also affect birds which continue to use the array area – e.g. by affecting foraging efficiency).
45. During construction and decommissioning, the presence and movement of vessels (including towing of floating offshore units (FOUs); see **Section 3.1**) and construction works may temporarily disturb seabirds from offshore foraging or roosting areas, causing changes in behaviour or displacing them from the affected areas (NatureScot, 2023b). This temporary disturbance may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population (Statutory Nature Conservation Bodies (SNCBs), 2022). Potential effects from these sources of disturbance are relevant to qualifying features of the breeding seabird colony SPAs as well as to the seabird qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA which may use the marine environment in which construction activities will occur (including construction vessel movements between assembly port and WFDA). This impact pathway is assessed qualitatively, based on knowledge of the species' biology and the type and scale of activities which will determine the potential effects.
46. Details of the European Sites and qualifying features for which disturbance is determined to have the potential to result in adverse effect during construction and decommissioning are detailed in **Table 2.1**.

4.1.1.2 Displacement

47. As explained, above, for the purposes of this assessment, disturbance and displacement are being considered as separate impact pathways.
48. During construction and decommissioning, the presence and movement of vessels (including towing of FOUs; see **Section 3.1**) and construction works may cause changes in behaviour or displacement of seabirds as a result of disturbance from offshore foraging or roosting areas

(NatureScot, 2023d). Temporary displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population (SNCBs, 2022).

49. Based on NatureScot (2023d) the potential impacts due to the displacement of gannets during the breeding and non-breeding season will be considered. Guillemot, razorbill and kittiwake will be considered for both breeding and non-breeding season effects, but, for puffin, effects are considered to be limited to the breeding season, in accordance with NatureScot advice (**Table 2.1**). Seabird and waterbird features of marine SPAs in which project activities may occur will be considered for breeding season and/or non-breeding season effects as appropriate to the seasons for which the species is a qualifying feature of the SPA. This impact pathway is assessed using a quantitative and model-based approach as per NatureScot (2023d) guidance.
50. Details of the European Sites and qualifying features for which displacement is determined to have the potential to result in adverse effect during construction and decommissioning are detailed in **Table 2.1**.

4.1.1.3 Changes to Prey Availability

51. During construction and decommissioning, indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance (NatureScot, 2023b), caused by construction activities that disturb the seabed (and cause increased suspended sediment concentrations) or increase subsea noise levels. Reduction or disruption to prey availability to seabirds may cause displacement from foraging grounds in the area or reduced energy intake, affecting survival rates or productivity in the population in the short-term (SNCBs, 2022). As above, migratory non-seabird species would not be significantly affected when passing through (or over) the Bellrock WFDA on migration (as they are not expected to forage or rest in the marine environment around the Bellrock WFDA).
52. During construction there are several ways in which effects on prey availability may manifest, notably via underwater noise from piling for driven pile anchors affecting fish abundance and distribution, increases in suspended sediment concentrations (SSCs) reducing the abundance and distribution of fish or the efficacy of foraging by seabirds and disturbance to prey species affecting their abundance and availability. Similar effects could occur during decommissioning but with the additional possibility that prey abundance could decline from the levels present during the O&M period, if there was evidence of species using the mooring lines and anchors as artificial reefs (Smyth et al, 2015).
53. This impact pathway is assessed qualitatively, based on knowledge of species biology and the potential levels of activities which will determine the scale of the effect, as well as by reference to the findings in **Chapter 7: Benthic Ecology (Volume II)** and **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
54. Details of the European Sites and qualifying features for which disturbance is determined to have the potential to result in adverse effect during construction and decommissioning are detailed in **Table 2.1**.

4.1.2 Operation and Maintenance

4.1.2.1 Disturbance

55. As explained above, in the construction and decommissioning section, for the purposes of this assessment, disturbance and displacement are being considered as separate impact pathways.
56. During O&M, the presence of operational WTGs and associated maintenance vessels may disturb seabirds from foraging or roosting areas over the long-term. This may lead to a reduction in foraging opportunities or increased competition and energy expenditure, resulting in decreased survival rates or productivity in the population (SNCBs, 2022).
57. This impact pathway is assessed qualitatively, based on knowledge of the species' biology and the type and scale of activities which will determine the potential effects.
58. Details of the European Sites and qualifying features for which disturbance is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.1.2.2 Displacement

59. As explained above, in the construction and decommissioning section, for the purposes of this assessment, disturbance and displacement are being considered as separate impact pathways.
60. During O&M, the presence of operational WTGs and associated maintenance vessels may disturb seabirds and displace them from foraging or roosting areas over the long-term. This may lead to a reduction in foraging opportunities or increased competition and energy expenditure, resulting in decreased survival rates or productivity in the population (SNCBs, 2022).
61. Such effects are most likely in relation to seabirds using the marine habitats within the Bellrock WFDA, although species are known to vary in their sensitivity to displacement (e.g. large gull species show little evidence of displacement from OWFs whereas gannet and red-throated diver show marked displacement (Dierschke et al. 2016; Heinänen et al. 2020).
62. Based on NatureScot (2023d) the impacts due to displacement on gannets during the breeding and non-breeding season will be considered. Kittiwake, guillemot and razorbill will be considered for both breeding and non-breeding season effects, but, for puffin, effects are considered to be limited to the breeding season, in accordance with the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)** and NatureScot advice (see **Section 1**).
63. This impact pathway is assessed using a quantitative and model-based approach as per NatureScot (2023d) guidance.
64. Details of the European Sites and qualifying features for which displacement is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.1.2.3 Barrier to Movement

65. During O&M, the presence of the Bellrock Wind Farm Infrastructure may act as a barrier to seabirds and/or migratory non-seabird species. This could cause individuals to deviate their flight trajectories and either fly around or above the Bellrock Wind Farm Infrastructure (NatureScot, 2023d), which

may lead to increased energy expenditure, resulting in decreased survival rates or productivity in the population (SNCBs, 2022).

- 66. This impact pathway is assessed using a model-based approach as per NatureScot (2023d) guidance.
- 67. Details of the European Sites and qualifying features for which barrier to movement is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.1.2.4 Collision Risk

- 68. During O&M, collisions of seabirds and/or migratory non-seabirds with the rotating blades of the WTGs may result in the death or injury of individuals (NatureScot, 2023c). Such mortality may be additive, so could cause population declines or, in some situations, prevent population recovery. Therefore, seabird species which forage within, or commute through, the Bellrock WFDA may be vulnerable to such effects, as is also the case for migratory non-seabirds which transit this area on migration. For seabirds, collision risk may vary between species in relation to a range of factors associated with flight behaviour but with flight heights being of fundamental importance in predicting the vulnerability to this effect (Johnston et al. 2014a; b). Thus, species which fly at low heights and below the rotor swept area (e.g. fulmar and auk species) are not vulnerable to this effect pathway, in contrast to other species which generally fly at greater heights and are at risk of collision for a proportion of their flight time (e.g. kittiwake, large gull species and gannet) (NatureScot, 2023c). Given the offshore location of the Bellrock WFDA, it is extremely unlikely that any of the migratory non-seabird species associated with European Sites would make more frequent movements across the Bellrock WFDA (e.g. when commuting between foraging and roosting sites), and it is considered that collision risk for these species is limited to their migratory movements.
- 69. This impact pathway is assessed using a quantitative model-based approach as per NatureScot (2023c) guidance.
- 70. Details of the European Sites and qualifying features for which collision risk is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.1.2.5 Changes to Prey Availability

- 71. During the O&M period, indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance in the marine environment due to the presence of offshore infrastructure, and as a result of O&M activities that disturb the seabed (and cause increased suspended sediment concentrations) or increase subsea noise levels. In comparison to construction, however, subsea noise levels will be significantly lower in the O&M phase (e.g. there will be no piling), therefore, the potential for adverse effects on prey species as a result is greatly reduced. Similarly, seabed disturbance and associated increased suspended sediment concentrations will also be substantially lower in the O&M phase, namely occurring during cable or substructure maintenance activities.
- 72. Migratory non-seabird species would not be significantly affected when passing through (or over) the Bellrock WFDA on migration (as they are not expected to forage or rest in the marine environment around the Bellrock WFDA).

73. This impact pathway is assessed qualitatively, based on knowledge of the species' biology and the type and scale of activities which will determine the potential effects, as well as by reference to the findings from **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
74. Details of the European Sites and qualifying features for which changes to prey availability is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.1.2.6 Secondary Entanglement

75. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be in place to collect and remove any such debris which will decrease the risk of secondary entanglement for the relevant seabird species.
76. This impact pathway is assessed, based on knowledge of the species' biology and the type and scale of activities which will determine the potential effects.
77. Details of the European Sites and qualifying features for which secondary entanglement is determined to have the potential to result in adverse effect during O&M are detailed in **Table 2.1**.

4.2 Matters Relevant to the Interpretation of the Assessment Conclusions

4.2.1 Implications of the Outbreak of Highly Pathogenic Avian Influenza

4.2.1.1 Background

78. The current H5N1 strain of Highly Pathogenic Avian Influenza (HPAI) has led to the largest HPAI panzootic ever recorded, with the virus being present year-round and spreading across the globe (Atkinson and Baillie, 2024). Within the UK, it has affected wild bird populations on an unprecedented scale since being first recorded in breeding populations of great skua in the summer of 2021, with seabirds and waterfowl being particularly affected (Tremlett et al. 2024).
79. In relation to the current assessment of the effects of the Bellrock WFDA on European Designated Sites, the implications of the HPAI outbreak are likely to be greatest for the assessments of the breeding seabird colony SPAs. This is because:
- Some the most marked effects of HPAI have been recorded in seabird populations;
 - Amongst the SPAs for which the potential for LSE has been concluded, it is the breeding seabird colony SPAs where the potential for impacts associated with the Bellrock Wind Farm Infrastructure is considered to be greatest (see **Section 4.3** to **Section 4.5**); and
 - The assessments for the breeding seabird colony SPAs rely upon the project-derived baseline data, which being contemporaneous with the HPAI outbreak, could potentially be affected by the resultant high mortality recorded in some seabird populations.

80. Thus, consideration of the implications of the HPAI outbreak on the findings and conclusions of the current assessment focusses on the breeding seabird colony SPAs.

4.2.1.2 HPAI and Seabird Populations

81. As stated above, the first evidence of mortality in UK seabirds resulting from infection by HPAI came in the form of unusually high mortality rates in great skua populations between June and October 2021 (Banyard et al. 2022). Amongst seabird species in the UK, this 2021 outbreak was apparently restricted to great skua. However, over the course of the 2022 breeding season, HPAI was identified as a cause of apparently increased mortality in a range of seabird species (MacArthur Green, 2023). Mortality was particularly high in tern species, gannet, common guillemot, and great skua (Tremlett et al. 2024, Lane et al. 2023).
82. The Royal Society for the Protection of Birds (RSPB) established a HPAI Seabird Surveys Project which provided a comparison of pre-HPAI colony counts from the Seabirds Count census (Burnell et al. 2023) and post-HPAI counts, following surveys undertaken in summer 2023 (Tremlett et al. 2024). This comparison provides species- and colony-specific evidence of the apparent magnitude of mortality resulting from HPAI in 2022, and of the consequent short-term changes in the population sizes for a range of the colonies (including several of the SPA populations which have been taken forward to the Phase Two assessment for the Bellrock WFDA). In addition, at the time of writing, further colony count data from 2024 were available on the Seabird Monitoring Programme (SMP) database (Joint Nature Conservation Committee (JNCC) and British Trust for Ornithology (BTO), 2025) for several of the SPA populations taken forward to the Phase Two assessment, whilst other sources provided count data for specific colonies (Clarkson et al. 2022, Harris et al. 2023). In some cases, these post-HPAI counts did not encompass the entire SPA but, rather, the main count sectors within the SPA that had historically held the majority of the SPA population of the species in question (e.g. see **Section 4.4.2.20** and **Section 4.4.2.3** in relation to the Fowlsheugh SPA).
83. For the breeding seabird colony SPAs taken forward to the Phase Two assessment, the key species in terms of qualifying features (or named components of the seabird assemblage feature) were kittiwake, razorbill, puffin and gannet (**Table 2.1**). Evidence relating to the impacts of HPAI on the populations of each of these species with particular reference to the assessment for the Bellrock WFDA is as follows:
- **Kittiwake:** Kittiwake was considered to be subject to moderate levels of observed HPAI mortality in 2022 (Tremlett et al. 2024). However, in the pre- and post-HPAI comparisons undertaken by Tremlett et al. (2024), the recorded population of kittiwake at all surveyed sites increased after the 2022 HPAI outbreak by an average of 8%. In relation to the Bellrock WFDA, eight SPA populations accounted for 75% of the kittiwake breeding season apportionment, noting that non-SPA colonies accounted for 22% (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). Amongst these eight SPA populations, the estimated population sizes were higher post-HPAI (2023 and/or 2024) than pre-HPAI in five cases (i.e. Buchan Ness to Collieston Coast, Fowlsheugh, St Abb's Head to Fast Castle, Forth Islands and Troup, Pennan and Lion's Heads), including for the two SPA populations with the highest breeding season apportionment values². The estimates were lower post-HPAI (2023

² Details of the population estimates, and of differences in these pre- and post-HPAI, for SPA populations are provided in the introductory sections to each population within **Section 4.4**.

and/or 2024) than pre-HPAI in two cases (i.e. Farne Islands and East Caithness Cliffs), whilst the most recent estimate for the remaining SPA (Flamborough and Filey Coast) derived from the year of the outbreak. Thus, the available data suggest that the colony populations from which kittiwakes using the Bellrock WFDA are considered most likely to derive (at least during the breeding season) have tended to increase overall since the HPAI outbreak.

- **Razorbill:** Razorbill was considered to be subject to low levels of observed HPAI mortality in 2022 (Tremlett et al. 2024). No pre- and post-HPAI comparison of razorbill population sizes is provided in Tremlett et al. (2024). In relation to the Bellrock WFDA, the Fowlsheugh SPA population accounts for 72% of the razorbill breeding season apportionment and is the only SPA razorbill population identified as having potential connectivity to the Bellrock WFDA (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). Based upon estimates from the RSPB reserve count sector (which is estimated to hold over 80% of the Fowlsheugh SPA population (**Section 4.4.2.3**)), the population has increased between the time of Seabirds Count census (pre-HPAI) and 2023. Thus, as for kittiwake, the available data suggest that the colony populations from which razorbills using the Bellrock WFDA are considered most likely to derive (at least during the breeding season) have tended to increase overall since the HPAI outbreak.
- **Puffin:** Puffin was considered to be subject to low levels of observed HPAI mortality in 2022 (Tremlett et al. 2024). No pre- and post-HPAI comparison of puffin population sizes is provided in Tremlett et al. (2024). In relation to the Bellrock WFDA, the Farne Islands SPA and Forth Islands SPA populations together account for 76% of the puffin breeding season apportionment (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). In both cases, the 2024 population size estimates were higher than those derived in the Seabirds Count census. No post-HPAI estimate was available for the Coquet Island SPA puffin population, which accounts for 19% of the breeding season apportionment. Thus, as for kittiwake and razorbill, the available data suggest that the colony populations from which puffins using the Bellrock WFDA are considered most likely to derive (at least during the breeding season) have tended to increase overall since the HPAI outbreak.
- **Gannet:** Gannet was considered to be subject to high levels of observed HPAI mortality in 2022 (Tremlett et al. 2024). The recorded population of gannet at surveyed sites decreased after the 2022 HPAI outbreak by an average of 25% compared to the pre-HPAI baseline (Tremlett et al. 2024). In relation to the Bellrock WFDA, the Forth Islands SPA population accounts for 72% of the gannet breeding season apportionment (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). This SPA population was estimated to be 31% smaller in 2023 than it was prior to the HPAI outbreak (Harris et al. 2023). With the exception of the Flamborough and Filey Coast SPA (**Section 4.4.11.4**), declines were recorded in most other SPA gannet populations from which birds using the Bellrock WFDA are likely to derive, albeit that these were small in some cases (Tremlett et al. 2024).

4.2.1.3 Implications for the Assessment

84. Possible ways in which the effects of HPAI could lead to bias and flaws in the findings and conclusions of the Phase Two assessment include:

- Reliance on pre-HPAI estimates for the SPA populations, if HPAI had resulted in population declines. This would mean that predicted impacts were related to overestimates of the current population size, causing underestimation of the impact; and

- Reliance on baseline data which derived from after the advent of HPAI, if HPAI resulted in reduced at-sea densities. This could also lead to underestimation of predicted impacts.

85. The first of these possibilities can be excluded because for three of the four species considered above there is no suggestion of any tendency for lower population sizes post-HPAI, whilst the assessment is also able to rely on post-HPAI estimates for many of the SPA populations of these species. For gannet, which has shown marked declines following HPAI, the assessment relies on post-HPAI estimates for seven of the eight SPA populations, with the eighth population (Sule Skerry and Sule Stack SPA) having partial coverage with post-HPAI counts (see **4.4.16.2**).
86. In relation to the second possibility, the baseline DAS programme was undertaken between March 2022 and February 2024, so that the majority of surveys occurred subsequent to the 2022 HPAI outbreak but with the earlier surveys being prior to the outbreak. The estimated densities of several species (including all four considered here) were markedly higher in the 2022 breeding season months than in the 2023 breeding season months (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**). Such a pattern could be indicative of HPAI effects, although marked between-year variation in density estimates is not atypical in such DAS data. Furthermore, the marked reduction in the 2023 breeding season density estimates was apparent in all four species, despite their differing levels of vulnerability to HPAI (Tremlett et al. 2024). The absence of post-HPAI declines in most of the SPA populations of kittiwake, razorbill and puffin from which individuals of these species using the Bellrock WFDA are considered most likely to derive is not consistent with HPAI being the cause of the between-year differences in the estimated at-sea densities.
87. NatureScot has not yet provided guidance on approaches to dealing with the potential issues of HPAI in assessments. However, Natural England advice states that DAS data collected after summer 2022 are liable to have been influenced by the 2022 HPAI outbreak and suggests that any changes in abundance at colonies are likely to be reflected proportionately in the at-sea densities (Natural England, 2022). Consequently, where seabird colony count data and DAS data have both been collected either pre-summer-2022 or post-summer-2022, the predicted impacts of the development on colony populations are expected to be robust to the impacts of HPAI on populations. By contrast, where; (i) seabird colony count data have been collected pre-summer 2022 and DAS data have been collected post-summer 2022, any reduction in seabird abundance resulting from HPAI could result in an underestimation of the impact of the development on colony populations, and (ii) where seabird colony count data have been collected post-summer 2022 and DAS data have been collected pre-summer 2022, any reduction in seabird abundance resulting from HPAI could result in an overestimation of the impact of the development on colony populations.
88. The above advice from Natural England suggests that any effects of HPAI on the assessment for the Bellrock WFDA are likely to result in the overestimation of predicted impacts (and therefore, be precautionary). This is because (as detailed above) many of the SPA population estimates used for the assessment derive from post-HPAI counts and where pre-HPAI counts are used these involve species for which there is no apparent tendency for post-HPAI declines. However, the DAS data encompasses the early part of the 2022 breeding season, before any HPAI effects on at-sea densities would have been apparent. Of the four species considered here, this source of

underestimation could only be relevant to gannet, as the only species with clear post-HPAI declines in the SPA population sizes.

89. Based on the considerations that have been set out above, it is concluded that any effects of HPAI are unlikely to result in bias or flaws in the assessment findings and conclusions, and that the Phase Two assessments of breeding seabird colony SPAs are robust to the effects of HPAI.

4.2.2 Precautionary Assumptions in the Assessments of Breeding Seabird Colony SPAs

90. The assessments undertaken on the breeding seabird colony SPAs (**Section 4.4**) incorporate a series of precautionary assumptions, which are likely to mean that the scale of the impacts will be overestimated relative to that derived on the basis of the best available evidence. These precautionary assumptions often relate to discrete elements of the assessment. As such, their incorporation involves a series of unlikely (and precautionary) outcomes for these different elements, and the assessment conclusion essentially equates to the multiplication of a series of small probabilities. This, in turn, means that the conclusions will be overly precautionary and highly unlikely to arise. Details of some of the main precautionary assumptions are presented below.
91. As described in **Section 4.4** (and **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**), the methods used in the current assessment for predicting the mortality that could potentially arise from the effects of displacement and barrier effects during the O&M phase entail setting species-specific rates of displacement and of mortality amongst displaced birds. The rates used in this assessment for each species align with the NatureScot (2023d) guidance, but these are often more precautionary than would be derived from the available evidence. Thus, for razorbill, reviews of the available data indicate mixed responses to the presence of OWFs (including attraction in at least one study), with the overall tendency appearing to be a weak (< 50%) displacement effect (Dierschke et al. 2016, APEM, 2022a, Furness et al. 2025).
92. Amongst the studies reporting displacement effects, this is limited to the geographical extent of the wind farm, in some cases with no displacement detected from the 2 km buffer of the wind farm. This compares to the application of a 60% displacement rate for razorbill from across the WFDA plus 2 km buffer within this assessment, as advised by NatureScot (2023d). Furthermore, the APEM (2022a) review concluded that studies amongst the auk species (mainly pertaining to guillemot but including razorbill) which indicated displacement rates in excess of 50% tended to be associated with low abundance and high numbers of zero counts, reducing confidence in the displacement rate estimates that were derived.
93. Similarly, for kittiwake, the evidence suggests no overall tendency for displacement from OWFs, with responses being highly variable but tending towards an average of no displacement or attraction (Dierschke et al. 2016, Furness et al. 2025). Despite this, the NatureScot (2023d) guidance advises the application of a 30% displacement rate.
94. For gannet, NatureScot (2023d) advise a 70% displacement rate, which accords with the high rates of macro-avoidance of OWFs recorded for this species (APEM, 2022b, Pavat et al. 2023, Furness et al. 2025), whilst for puffin there is a paucity of data with which to assess the veracity of the 60% rate advised by NatureScot (2023d) (although it is reasonable to argue that responses are likely to

be similar to those of other auk species, which accords broadly with the findings relating to puffin at the Beatrice Wind Farm (Trinder et al. 2024)).

95. The methods advised by NatureScot for determining mortality from displacement during the O&M phase also rely on use of the mean peak abundance of birds within the WFDA plus 2 km buffer, as opposed to the mean abundance (NatureScot, 2023d, **Section 4.4** and **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). Thus, by definition, the resultant predicted mortalities are derived from estimates that are unlikely to be representative of the typical abundance on the WFDA plus 2 km buffer. The extent of potential overestimation resulting from the use of the mean peak abundance is illustrated in **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**, which demonstrates that for kittiwake, razorbill, puffin and gannet the mean abundance in each of the defined seasonal periods is never more than half (and often substantially less than half) of the value of the mean peak abundance.
96. In terms of predicting collision mortality, the methods used in the current assessment account for macro-avoidance of OWFs by gannet during the non-breeding periods only (**Section 4.4**, and **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)**). This is in accordance with NatureScot advice but is contrary to the recommendations of the Pavat et al. (2023) review, which assesses the evidence and sets out the justification for accounting for macro-avoidance in gannet collision mortality predictions (**Table 1.1**, NatureScot, 2025). Thus, Pavat et al. (2023) recommend that macro-avoidance by gannets should be accounted for in the predicted collision mortality during all seasonal periods. This has major implications for the current assessment because the breeding season accounts for 62 - 98% of the predicted annual collision mortality for each of the eight SPA gannet breeding populations taken forward to the Phase Two HRA assessment when considering the Bellrock WFDA alone (**Section 4.4**). Also, for three of these populations (i.e. the Forth islands SPA, Flamborough and Filey Coast SPA and Sule Skerry and Sule Stack SPA) the predicted collision mortality for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is an order of magnitude or more greater for the breeding season than for the combined non-breeding periods (**Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
97. NatureScot advises that macro-avoidance should not be applied during the breeding season because the evidence base for the occurrence of macro-avoidance (or at least the level of macro-avoidance) is weaker for the breeding season than for the non-breeding season (**Table 1.1**). Although this is the case, there is clearly evidence of macro-avoidance during the breeding season and, therefore, the advised approach will lead to overestimation of gannet collision mortality (Peschko et al. 2021, Pavat et al. 2023, Furness et al. 2025). Notably, there is no concomitant reduction in the advised displacement rate for gannet during the breeding season (which, as detailed above, is set at 70% irrespective of seasonal period (NatureScot, 2023d)). If it is the case that 70% of the gannets estimated to occur within the area of the WFDA plus 2 km buffer prior to the development are subsequently displaced during the O&M phase, the logical corollary must be that there is a reduction in the estimated numbers of birds that are potentially at risk of collision (albeit that variation in the proportion of birds estimated to be in flight and sitting on the water may mean that such a reduction does not align with the displacement rate exactly). In an analogous way, the predicted collision mortality of kittiwakes is also likely to be overestimated because no account is made for the potential displacement of kittiwake from the WFDA plus 2 km buffer.

98. A likely major source of precaution in this assessment is that the Population Viability Analyses (PVAs) used to determine the level of impact at the population level are based upon density independent population models, which is in accordance with NatureScot (2023e) guidance³. This approach is biologically implausible because it assumes no population regulation and permits unrealistic predictions of unlimited population growth. Instead, it is likely that compensatory density dependence will operate within the SPA populations that are being assessed, so that mortality from the wind farm effects is offset to (at least) some degree by changes in other demographic parameters (e.g. increased rates of breeding productivity or reduced age of first breeding), as opposed to being wholly additive. There is empirical evidence for compensatory density dependence acting on seabird populations generally (Horswill et al. 2016), with further evidence relating to individual species (e.g. for kittiwake, evidence supporting the occurrence of intra-specific density dependent competition and the operation of compensatory density dependence comes from studies demonstrating, for example, that the numbers breeding at a colony are influenced by those at neighbouring colonies, that birds from larger colonies travel further to forage and that annual rates of increase in colony size are inversely related to the colony size whilst declines at colonies in northern parts of the UK have been greatest at the largest colonies (Furness and Birkhead 1984, Coulson 2011, Furness 2015, Wakefield et al. 2017)).
99. Although seabird populations may also be subject to compensatory density dependent effects (whereby the rate of decline increases as colony size reduces – e.g. due to increased vulnerability to predation), this is more likely to occur when populations are small and heading towards local extinction, which would apply to very few of the breeding seabird colony SPA populations considered in **Section 4.4** (Horswill et al. 2016). Therefore, the underlying basis for predicting the population-level impacts is unrealistic and likely to give overly precautionary outputs.
100. A further source of precaution in this assessment, which is specific to kittiwake, is that the predicted breeding season impacts are disproportionately assigned to the breeding adult (as opposed to subadult) component of the populations. This is because the approach used to determine age classes during the breeding season overestimates the proportion of adult birds, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Section 4.4.1.2.1**. Consequently, the predicted impacts on the SPA kittiwake populations will be overestimated (because populations are generally more sensitive to changes in the survival rates of breeding adults than of the other age classes, particularly in relatively long-lived, k-selected, species such as kittiwake (Stahl and Oli, 2006)).
101. Each of the elements described above add precaution into the assessment and at a basic level, this is aligned with, and integral to, the adoption of a precautionary approach to the assessment. However, where precaution is incorporated into a series of discrete elements of the assessment (as is the case here) it will mean that the likelihood of the assessment outcome actually occurring is extremely low because it equates to the multiplication of a series of low probabilities (i.e. the consequence of the outcome from each element being an unlikely event). The scale by which impacts are overestimated will be further increased within the assessment of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects because the elements of

³ PVAs are used to determine the level of impact on SPA breeding seabird populations where the additional mortality predicted to arise during the O&M phase from displacement (inclusive of barrier effects) and/or collisions represents a percentage point increase in the baseline mortality of more than 0.02 (Section 4.4, **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

precaution are likely to be replicated through the majority of plans and projects contributing to in-combination assessment.

4.3 Assessment of Potential Adverse Effects on Integrity: Marine SPAs

4.3.1 Outer Firth of Forth and St Andrew's Bay Complex SPA

4.3.1.1 European Site Information and Conservation Objectives

102. The Outer Firth of Forth and St Andrews Bay Complex SPA stretches from Arbroath to St. Abb's Head encompassing the Firth of Forth, the outer Firth of Tay and St. Andrews Bay and comprises an area of 2,720.68 km². The site extends beyond the 12 nautical miles (nm) boundary of territorial and offshore waters to encompass key seabird feeding areas.
103. The Outer Firth of Forth and St Andrews Bay Complex SPA qualifies under Article 4.2 by regularly supporting breeding seabirds, non-breeding seabirds and waterfowl assemblages. The potential for LSE has been identified in relation to three species (**Table 4.1**), with the effect pathways associated with LSE for each of these detailed in **Table 2.1** and set out in the assessment below.
104. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To ensure that the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status; and
 - To ensure that the integrity of the Outer Firth of Forth and St Andrews Bay Complex SPA is restored in the context of environmental changes by meeting the following objectives for each qualifying feature:
 - The populations of the qualifying features are viable components of the Outer Firth of Forth and St Andrews Bay Complex SPA;
 - The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species; and
 - The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Outer Firth of Forth and St Andrews Bay Complex SPA.
105. The Bellrock WFDA does not overlap with the SPA, so the potential impacts on its qualifying features will only occur as a result of potential vessel movements through, or within the vicinity of, the SPA. This could arise as vessels transit between the WFDA and ports on the east coast of Scotland. Other potential effects of the Bellrock WFDA on breeding and non-breeding seabird qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA will be encompassed by the assessments for the breeding seabird colony SPAs with which these features

are associated (see **Section 4.4**), whilst the WFDA is well beyond 15 km from the SPA, which is the distance advised in NatureScot (2023f) guidance for considering impact pathways for other qualifying features of marine SPAs.

106. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objectives to ensure that populations of qualifying features are viable components of the site, and to ensure that the distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species, because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of these conservation objectives.

Table 4.1: Details on the Qualifying Features of the Outer Firth of Forth and St Andrews Bay Complex SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Red-throated diver	Non-Breeding	Favourable	851 individuals	Yes
Slavonian grebe	Non-Breeding	Favourable	30 individuals	Yes
Common eider	Non-Breeding	Favourable	21,546 individuals	Yes
Long-tailed duck ¹	Non-Breeding	Favourable	1,948 individuals	Yes
Common scoter ¹	Non-Breeding	Favourable	4,677 individuals	Yes
Velvet scoter ¹	Non-Breeding	Favourable	775 individuals	Yes
Common goldeneye ¹	Non-Breeding	Favourable	589 individuals	Yes
Red-breasted merganser ¹	Non-Breeding	Favourable	431 individuals	Yes
Little gull	Non-Breeding	Favourable	126 individuals	Yes
Common Tern	Breeding	Unfavourable	N/A	No
Arctic Tern	Breeding	Favourable	N/A	No
Gannet	Migratory	Favourable	10,945 individuals	Yes
Puffin ²	Breeding	Favourable	61,086 individuals	Yes
Kittiwake ²	Breeding	Unfavourable	12,020 individuals	Yes
Kittiwake ²	Non-breeding	Favourable	3,191 individuals	Yes
Manx shearwater ²	Breeding	Favourable	2,885 individuals	No
Guillemot ²	Breeding	Favourable	28,123 individuals	Yes
Guillemot ²	Non-breeding	Favourable	21,968 individuals	Yes
Herring gull ²	Breeding	Unfavourable	3,044 individuals	No
Herring gull ²	Non-breeding	Favourable	12,313 individuals	No

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Black-headed gull ²	Non-breeding	Favourable	26,835 individuals	Yes
Common gull ²	Non-breeding	Favourable	14,647 individuals	Yes
Shag	Non-breeding	Favourable	2,426 individuals	Yes
Razorbill ²	Non-breeding	Favourable	5,481 individuals	Yes
Notes: ¹ Named component of the waterfowl assemblage only. ² Named component of seabird assemblage only.				

4.3.1.2 Qualifying Features and Effect Pathways

107. Of the 25 qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA, the potential for LSE was identified for 20 (**Table 2.1**). In each case, this was on the basis of potential disturbance and displacement effects due to vessels transiting between the Bellrock WFDA and ports on the east coast of Scotland during the construction, O&M and decommissioning phases. In addition, for eight of these 20 qualifying features the potential for LSE was also identified in relation to collision and barrier effects during the O&M phase, with the risk of these effects being associated with migratory movements in spring and autumn (**Table 2.1**).
108. The details of the assessment of collision and barrier effects for these eight qualifying features are set out in **Section 4.5** on the migratory non-seabird species. This is because the assessment of collision and barrier effects on migratory non-seabirds is undertaken at the species level and encompasses the species which comprise these eight qualifying features.

4.3.1.3 Project Alone: Construction and Decommissioning

4.3.1.3.1 Displacement and Disturbance

109. Displacement and disturbance for the Outer Firth of Forth and St Andrews Bay Complex SPA is only relevant in the context of vessels moving through, or within the vicinity of, the SPA, when transiting between the potential ports (Section 6.5 **Appendix 12.1: Navigational Risk Assessment (Volume IV)**) and the Bellrock WFDA during the eight-year construction period (including site preparation works). Therefore, considering the list of potential ports during this period, the worst-case scenario (and therefore the most precautionary approach) for the Outer Firth of Forth and St Andrews Bay Complex SPA assessment would be to consider all vessels being based out of Rosyth port, which is located the furthest into the SPA and therefore, vessels transiting from this port would have the longest distance to travel through the SPA to reach the Bellrock WFDA.
110. The predicted levels of vessel and other activity during construction (including site preparation works) and decommissioning of the Bellrock WFDA are described in **Section 3.1** above. The annual maximum number of site preparation and construction vessels transiting through the SPA is 231 round trips per year. It is worth noting that the number of annual round trips will vary between

years depending on the activities taking place, but the number of annual vessel round trips will not exceed 231. A total of 1,615 vessel round trips will occur during the maximum of 8 years of site preparation and construction activity for Bellrock WFDA Infrastructure (**Table 3.1**). Further detail on vessel movements can be found in the **Outline Vessel Management and Navigational Safety Plan (Volume V)**.

111. The most sensitive species to direct disturbance and displacement in the Outer Firth of Forth and St Andrews Bay Complex SPA are red-throated diver, common scoter and velvet scoter. When using the marine environment (and not at the breeding site), these species are considered to be highly sensitive to sources of vessel disturbance, scoring 4, 5 and 5 respectively on the five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013). All other species screened in for assessment of the disturbance impact pathway have a sensitivity of 3 or less (Garthe and Hüppop, 2004, Furness et al. 2013).
112. The non-breeding red-throated diver population present in the Outer Firth of Forth and St Andrews Bay Complex SPA represent 5% of the GB red-throated diver population (JNCC, 2020). As stated in **Table 4.1** above, the species is showing a favourable condition status at this SPA (NatureScot and JNCC, 2022) as well as the displaying a relatively stable trend (Woodward et al. 2015). Studies have shown that red-throated divers are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from an average of 600 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of red-throated diver in this SPA show the highest concentration of birds in the coastal areas of the St Andrews Bay, with much fewer birds seen in the Firth of Forth area (Marine Scotland, 2025).
113. The non-breeding common scoter present in the Outer Firth of Forth and St Andrews Bay Complex SPA represent 5% of the GB common scoter population (JNCC, 2020). As stated in **Table 4.1** above, the species is showing a favourable condition status at this SPA (NatureScot and JNCC, 2022) however the population also displays a slightly declining trend (Woodward et al. 2015). Studies have shown that common scoters are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from as close as 30 m and far as 2000 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of common scoter in this SPA show the highest concentration of birds in the coastal areas of the St Andrews Bay, with slightly lower densities seen close to the coast in the Firth of Forth (Marine Scotland, 2025). The extent of the data provided in Marine Scotland (2025) also indicates lower densities further offshore, although this data does not cover the full extent of the offshore sections of this SPA.
114. The non-breeding velvet scoter present in the Outer Firth of Forth and St Andrews Bay Complex SPA represent 23% of the GB velvet scoter population (JNCC, 2020). As stated in **Table 4.1** above, the species is showing a favourable condition status at this SPA (NatureScot and JNCC, 2022) however, the population also displays a slightly declining trend (Woodward et al. 2015). Studies have shown that velvet scoters are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from as close as 30 m and far as 2000 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of velvet scoter in this SPA show the highest concentration of birds in the mouth of the Firth of Tay and out into St Andrews Bay (Marine Scotland, 2025).

115. When comparing density maps of these three species (Marine Scotland, 2025) to the baseline levels of vessel activity in the Outer Firth of Forth and St Andrews Bay Complex SPA, the higher densities of these species can be seen to generally occur in areas with lower densities of vessel traffic, the highest densities of vessel traffic being in the Firth of Forth area of the SPA and out along the southern edge of the SPA (Anatec Ltd, 2012; MMO, 2014). Vessel density data from 2017-2023 indicates the highest annual average densities, are located around the ports in the Firth of Forth, the Firth of Tay and along the Berwick coast (Marine Scotland, 2025). The worst-case scenario of 231 annual round trips by vessels associated with Bellrock WFDA through the Outer Firth of Forth and St Andrews Bay Complex SPA is approximately equal to 3,003 hours of annual vessel activity. This is based on a precautionary estimation that assumes the vessels will be travelling at 6 knots (the recommended speed if close to marine wildlife (NatureScot, 2017c)) for the duration of transit through approximately 73 km of the SPA. From the vessel density data (Marine Scotland, 2025), it is estimated that there would be approximately 196,637 hours of vessel activity within the Outer Firth of Forth and St Andrews Bay Complex SPA annually. From this we can deduce that the vessel activity associated with the Bellrock Wind Farm Infrastructure during construction would represent a 1.5% increase in the overall annual vessel activity within this SPA.
116. The vessel route density data from the same time period shows that the highest density of vessel routes in this SPA are predominantly south of St Andrews Bay, with the majority of this southern area having between 250 and 1,000 vessel routes per square kilometre per year. Areas closest to the ports have shown densities of routes higher than this, in some cases up at 3,000 routes per square kilometre per year (Marine Scotland, 2025).
117. An Vessel Management and Navigation Safety Plan (VMNSP) will be produced as a primary (i.e., embedded) mitigation measure and will set out indicative transit corridors to the relevant ports, where this retains compliance with the Convention on International Regulations for Preventing Collisions at Sea (COLREGS), to minimise vessel volume in the areas outside of the agreed indicative transit corridors (see the **Outline VMNSP (Volume V)**). The worst-case design scenario laid out in **Table 3.1** details the maximum number of vessels on site at any one time as 34, which in itself limits the number of transits possible in a given time period. As detailed in the **Outline VMNSP (Volume V)** vessel movements will be aligned with the Scottish Marine Wildlife Watching Code (NatureScot, 2017b) and the associated Guide to Best Practice for Watching Marine Wildlife (NatureScot, 2017c), where practicable. As such, vessel operations will incorporate recognised good practice measures to reduce the risk of disturbance to, and collision with, marine mammals, seabirds, and other marine megafauna.
118. Where practicable, vessel movements will follow defined transit corridors, thereby concentrating activity within established navigation corridors and reducing the spatial extent of potential disturbance and collision risk. The number of vessel movements will be limited to those necessary for safe and efficient delivery of the works.
119. Based on the vessel details discussed above, it can be concluded that the levels of additional traffic from the construction of the Bellrock WFDA are within the expected levels of inter-annual fluctuation of vessel activity and would be undetectable against the existing levels of vessel activity in the Outer Firth of Forth and St Andrews Bay Complex SPA. Furthermore, as this assessment has been based on the worst-case scenario, it is expected that the actual effects will be less than assumed. Given this in context with the data on species distribution and density, and vessel route and densities, it is concluded that the potential disturbance and displacement caused by vessels

present due to the Bellrock WFDA during the construction and decommissioning phases will not have an adverse effect on the red-throated diver, common scoter and velvet scoter populations present in the Outer Firth of Forth and St Andrews Bay Complex SPA. This conclusion can also be extrapolated to the remaining species screened in for assessment (**Table 2.1**) for the Outer Firth of Forth and St Andrews Bay Complex SPA, due to their lower sensitivity scores leading to the assumption that any effects would be less than for the three species assessed in detail above.

4.3.1.4 Project Alone: Operation and Maintenance

4.3.1.4.1 Displacement and Disturbance

120. The method for assessing the effects of disturbance and displacement from vessels during the O&M phase is much the same as in **Section 4.3.1.2** for construction and decommissioning. However, during O&M there will be a maximum total of 211 round trips made annually by vessels transiting to and from the Bellrock WFDA. As this is less than the construction maximum total, it is expected that the effects of disturbance and displacement caused by vessels transiting through the Outer Firth of Forth and St Andrews Bay Complex SPA will also be less in the O&M phase.
121. This number of round trips is approximately equal to 2,743 hours of annual vessel activity. This is based on a precautionary approach that assumes the vessels will be travelling at 6 knots (the recommended speed if close to marine wildlife (NatureScot, 2017c)) for the duration of transit through approximately 73 km of the SPA. From the vessel density data (Marine Scotland, 2025), we can see an annual average vessel activity of 196,637 hours within the Outer Firth of Forth and St Andrews Bay Complex SPA annually. From this we can deduce that the vessel activity associated with the Bellrock Wind Farm Infrastructure during construction would represent an 1.4% increase in the annual vessel activity within this SPA. Further detail on vessel movements can be found in the **Outline VMNSP (Volume V)**.
122. Based on the vessel data discussed above, it can be concluded that the levels of additional traffic from the construction of the Bellrock WFDA are within the expected levels of inter-annual fluctuation of vessel activity and that they will make a very small overall difference to the existing levels of vessel activity in the Outer Firth of Forth and St Andrews Bay Complex SPA. Given this in context with the data on existing species, vessel and route densities it is concluded that the potential disturbance and displacement caused by vessels present due to the Bellrock WFDA during the O&M phase will not have an adverse effect on the red-throated diver, common scoter and velvet scoter populations present in the Outer Firth of Forth and St Andrews Bay Complex SPA, and by extrapolation to the remaining species from the SPA which have been screened in for assessment of disturbance and displacement during O&M (**Table 2.1**) due to their lower sensitivity to disturbance effects.

4.3.1.4.2 Collision and Barrier Effects

123. As stated above (**Section 4.3.1.2**), the assessments for the effects of collision and barrier effects on the eight qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA for which the potential for LSE was identified in relation to these effect pathways are incorporated into the assessments for the migratory non-seabird species (detailed in **Section 4.5** below).
124. The assessment concluded there is no potential for an adverse effect in relation to collision and barrier effects on these qualifying features due to the Bellrock WFDA alone.

4.3.1.5 Project Alone Conclusion

125. The potential effects from the Bellrock Wind Farm Infrastructure alone on the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA are predicted to be small and would not lead to any discernible impacts on the SPA populations. Given this, it is concluded that the effects of Bellrock WFDA alone would not result in an adverse effect on any of the SPA populations. Furthermore, it is also considered that there is also no possibility that any effects would be sufficient to make any meaningful contribution to an in-combination effect.

4.3.1.6 Site Conclusion

126. It is concluded that there is no potential for an adverse effect on any of the 20 qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA for which the potential for LSE was identified due to the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Outer Firth of Forth and St Andrews Bay Complex SPA.

4.3.2 Moray Firth SPA

4.3.2.1 European Site Information and Conservation Objectives

127. The Moray Firth SPA is a funnel-shaped area of marine habitat on the east coast of Scotland that includes the majority of coastal waters between Portsoy and Dunbeath and extends in places more than 10 km from the coast. The SPA includes the waters of the Moray Firth and Beaully Firth as well as the outer portion of the Dornoch Firth and comprises a total area of 1,762 km².
128. The Moray Firth SPA qualifies under Article 4.2 by regularly supporting populations of European importance of breeding seabirds, non-breeding seabirds and non-breeding waterfowl. The potential for LSE has been identified in relation to three species (**Table 4.2**), with the effect pathways associated with LSE for each of these detailed in **Table 2.1** and set out in the assessment below.
129. The conservation objectives of this SPA (as determined from NatureScot's SiteLink) are:
- To ensure that the qualifying features of the Moray Firth SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status; and
 - To ensure that the integrity of the Moray Firth SPA is restored in the context of environmental changes by meeting the following objectives for each qualifying feature:
 - The populations of the qualifying features are viable components of the site;
 - The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species; and
 - The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Moray Firth SPA.
130. The Bellrock WFDA does not overlap with the SPA, so the potential impacts on its qualifying features will only occur as a result of potential vessel movements through, or within the vicinity of, the SPA. This could arise as vessels transit between the WFDA and ports on the east coast of Scotland. Other potential effects of the Bellrock WFDA on breeding and non-breeding seabird

qualifying features of the Moray Firth SPA will be encompassed by the assessments for the breeding seabird colony SPAs with which these features are associated (see **Section 4.4**), whilst the WFDA is well beyond 15 km from the SPA, which is the distance advised in NatureScot (2023f) guidance for considering impact pathways for other qualifying features of marine SPAs.

131. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objectives to ensure that populations of qualifying features are viable components of the site, and to ensure that the distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species, because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of these conservation objectives.

Table 4.2: Details on the Qualifying Features of the Moray Firth SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Great-northern diver	Non-Breeding	Favourable	144 individuals	Yes
Red-throated diver	Non-Breeding	Favourable	324 individuals	Yes
Slavonian grebe	Non-Breeding	Favourable	43 individuals	Yes
Greater scaup	Non-Breeding	Unfavourable	930 individuals	Yes
Common eider	Non-Breeding	Favourable	1,733 individuals	Yes
Long-tailed duck	Non-Breeding	Favourable	5,001 individuals	Yes
Common scoter	Non-Breeding	Favourable	5,479 individuals	Yes
Velvet scoter	Non-Breeding	Unfavourable	1,488 individuals	Yes
Common goldeneye	Non-Breeding	Unfavourable	907 individuals	Yes
Red-breasted merganser	Non-Breeding	Favourable	151 individuals	Yes
Shag	Non-breeding	Favourable	6,462 individuals	Yes
Shag	Breeding	Favourable	5,494 individuals	Yes

4.3.2.2 Project Alone: Construction and Decommissioning

4.3.2.2.1 Displacement/Disturbance

132. Displacement and disturbance for the Moray Firth SPA is only relevant in the context of vessels moving through, or within the vicinity of, the SPA, when transiting between the potential ports (Section 6.5 of **Appendix 12.1: Navigational Risk Assessment (Volume IV)**) and the Bellrock WFDA during the eight-year site preparation and construction period. Therefore, considering the list of potential ports during this period, the worst-case scenario (and therefore the most precautionary approach) for the Moray Firth SPA assessment would be to consider all vessels being based out of Ardersier port, from which vessels transiting from this port would have the

longest distance to travel through the SPA to reach the Bellrock WFDA. The predicted levels of vessel and other activity during construction and decommissioning of the Bellrock WFDA are described in **Section 3.1** above. The annual maximum number of site preparation and construction vessels transiting through the SPA will be 231 round trips per year. It is worth noting that the number of annual round trips varies between years depending on the activities taking place, but no more than the maximum of 231 annual vessel round trips will be exceeded. A total of 1,615 vessel round trips will occur during the maximum of eight years of site preparation and construction activity for Bellrock WFDA infrastructure (**Table 3.1**). Further detail on vessel movements and can be found in the **Outline VMNSP (Volume V)**.

133. The most sensitive species to direct disturbance and displacement in the Moray Firth SPA are red-throated diver, great northern diver, common scoter and velvet scoter. When using the marine environment (and not at the breeding site), these species are considered to be highly sensitive to sources of vessel disturbance, scoring 4, 5, 5 and 5 respectively on the five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013). All other species screened in for assessment of the disturbance impact pathway have a sensitivity of 3 or less (Garthe and Hüppop, 2004, Furness et al. 2013).
134. The non-breeding great northern diver population present in the Moray Firth SPA represent 5.8% of the GB great northern diver population (NatureScot, 2020a). As stated in **Table 4.2** above, the species is showing a favourable condition status at this SPA (NatureScot, 2022a). In addition, aerial survey results from 2002-2007 and 2020 indicate an increasing population trend (Graham and Thompson, 2023). There is limited information on the effects of disturbance and displacement on great northern divers, although they have been recorded taking evasive avoidance action at distances of several kilometres from approaching vessels (Jarrett et al. 2018). Density maps of great northern diver in the Moray Firth SPA show the highest concentrations of birds to the east of Spey Bay with smaller densities in the Outer Dornoch Firth (Scott et al. 2023).
135. The non-breeding red-throated diver population present in the Moray Firth SPA represent 1.9% of the GB red-throated diver population (NatureScot, 2020a). As stated in **Table 4.2** above, the species is showing a favourable condition status at this SPA (NatureScot, 2022a). In addition, the population displays an overall declining trend (Caulfield et al. 2025). Studies have shown that red-throated divers are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from an average of 600 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of red-throated diver show the highest concentrations of birds in the Outer Dornoch Firth, Inverness Firth and along the coast of Easter Ross (Scott et al. 2023).
136. The non-breeding common scoter present in the Moray Firth SPA represent 5.5% of the GB common scoter population (NatureScot, 2020a). As stated in **Table 4.1** above, the species is showing a favourable condition status at this SPA (NatureScot, 2022a) despite this, the population displays a slightly declining trend (Lawson et al. 2015; Calbrade et al. 2025). Studies have shown that common scoters are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from as close as 30 m and far as 2000 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of common scoter

in this SPA show the highest concentration of birds in the inshore areas of the Dornoch firth, with other notable concentrations seen along the coast of Easter Ross (Scott et al. 2023).

137. The non-breeding velvet scoter present in Moray Firth SPA represent 59.5% of the GB velvet scoter population (NatureScot, 2020a). As stated in **Table 4.1** above, the species is showing an unfavourable condition status at this SPA (NatureScot, 2022a). In addition, the population displays both a short-term and long-term declining trend (Caulfield et al. 2025). Studies have shown that velvet scoters are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed from an as close as 30 m and far as 2000 m away from an approaching vessel (Fliessbach et al. 2019). Density maps of velvet scoter in this SPA show very small and localised concentrations along the coast of Easter Ross and north of Dornoch (Scott et al. 2023).
138. When comparing density maps of these four species (Scot et al. 2023) to the baseline levels of vessel activity in the Moray Firth SPA, the main concentrations of these species can be seen to partly occur in areas with lower densities of vessel traffic, and partly in similar areas. Density data from 2017-2023 indicate the highest densities of vessel traffic stretch from the Firth of Inverness across the coast of Easter Ross (Marine Scotland, 2025), this makes up the majority of the southern half of the Moray Firth SPA. In comparison, relatively low densities of vessel traffic is seen in and around Dornach Firth. The worst-case scenario of 231 annual round trips by vessels associated with Bellrock WFDA through the Moray Firth SPA is approximately equal to 3,234 hours of annual vessel activity. This is based on a precautionary estimation that assumes the vessels will be travelling at 6 knots (the recommended speed if close to marine wildlife (NatureScot, 2017c)) for the entire duration of transit through approximately 80 km across the SPA. From the vessel density data (Marine Scotland, 2025), it is estimated that there would be approximately 106,809 hours of vessel activity within the Moray Firth SPA annually. From this we can deduce that the vessel activity associated with the Bellrock Wind Farm Infrastructure during construction would represent a 2.8% increase in the overall vessel activity within this SPA, based on the worst-case scenario.
139. The vessel route density data from the same time period shows that the highest density of vessel routes in this SPA are predominantly stretch from the Firth of Inverness across the coast of Easter Ross, with the majority if this area having between 300 and 800 vessel routes per square kilometre per year. Areas closest to the ports have shown densities of routes higher than this, in some cases up at 1,500 routes per quare kilometre per year (Marine Scotland, 2025).
140. A VMNSP will be produced as primary (i.e., embedded) mitigation measure and will set out indicative transit corridors to the relevant ports, where this retains compliance with the Convention on International Regulations for Preventing Collisions at Sea (COLREGS), to minimise vessel volume in the areas outside of the agreed indicative transit corridors (see the **Outline VMNSP (Volume V)**). The worst-case design scenario laid out in **Table 3.1** also details the maximum number of vessels on site at any one time as 34, which in itself limits the number of transits possible in a given time period. As detailed in **Outline VMNSP (Volume V)**, vessels associated with the Bellrock Wind Farm Infrastructure will, where practicable, adhere to the best practice guidance (NatureScot, 2017c) approach to minimise the risk of disturbance, by reducing vessel transit speeds and by maintaining speed and course.
141. As a result of vessel details discussed above, it can be concluded that the levels of additional traffic from the construction of the Bellrock WFDA are within the expected levels of inter-annual

fluctuation of vessel activity and would be undetectable against the existing levels of vessel activity in the Moray Firth SPA. Given this in context with the data on species distribution and density, and vessel route and densities, it is concluded that the potential disturbance and displacement caused by vessels present due to the Bellrock WFDA during the construction and decommissioning phases are not expected to have an adverse effect on the red-throated diver, great northern diver, common scoter and velvet scoter populations present in the Moray Firth SPA. This conclusion can also be extrapolated to the remaining species screened in for assessment (**Table 2.1**) for the Moray Firth SPA, due to their lower sensitivity scores leading to the assumption that any effects would be less than for the four species assessed in detail above.

4.3.2.3 Project Alone: Operation and Maintenance

4.3.2.3.1 *Displacement and Disturbance*

142. The method for assessing the effects of disturbance and displacement from vessels during the O&M phase is much the same as in **Section 4.3.1.2** for construction and decommissioning. However, during O&M there will be a maximum total of 211 round trips made annually by vessels transiting to and from the Bellrock WFDA. As this is less than the construction maximum total, it is expected that the effects of disturbance and displacement caused by vessels transiting through the Moray Firth SPA will also be less in the O&M phase.
143. This number of round trips is approximately equal to 2,954 hours of annual vessel activity per year. This is based on a precautionary approach that assumes the vessels will be travelling at 6 knots (this is the recommended speed if close to marine wildlife (NatureScot, 2017c)) whilst transiting approximately 80 km across the SPA. From the vessel density data (Marine Scotland, 2025), we can see an annual average vessel activity of 106,809 hours within the Moray Firth SPA annually. From this we can deduce that the vessel activity associated with the Bellrock Wind Farm Infrastructure during O&M would represent an 2.8% increase in the annual vessel activity within this SPA.
144. As a result of vessel data discussed above, it can be concluded that the levels of additional traffic from the O&M of the Bellrock Wind Farm Infrastructure are within the expected levels of inter-annual fluctuation of vessel activity and that they will have a very small overall difference to the existing levels of vessel activity in the Moray Firth SPA. Given this in context with the data on existing species, vessel and route densities it is concluded that the potential disturbance and displacement caused by vessels present due to the Bellrock Wind Farm Infrastructure during the maintenance phase are not expected to have an adverse effect on the red-throated diver, great northern diver, common scoter and velvet scoter populations present in the Moray Firth SPA. This conclusion can also be extrapolated to the remaining species screened in for assessment (**Table 2.1**) for the Moray Firth SPA, due to their lower sensitivity scores leading to the assumption that any effects would be less than for the four species assessed in detail above.

4.3.2.4 Project Alone Conclusion

145. The potential effects from the Bellrock Wind Farm Infrastructure alone on the qualifying features of the Moray Firth SPA are predicted to be small and would not lead to any discernible impacts on the SPA populations. Given this, it is concluded that the effects of Bellrock WFDA alone would not result in an adverse effect on these populations. Furthermore, it is also considered that there is

also no possibility that any effects would be sufficient to make any meaningful contribution to an in-combination effect.

4.3.2.5 Site Conclusion

146. It is concluded that there is no potential for an adverse effect on any of the qualifying features of the Moray Firth SPA for which the potential for LSE was identified due to the Bellrock WFDA alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Moray Firth SPA.

4.3.3 Scapa Flow SPA

4.3.3.1 European Site Information and Conservation Objectives

147. The Scapa Flow SPA is located in the Orkney Islands and comprises a total area of 318 km². Most of the site lies within the enclosed waters of Scapa Flow, sheltered by Orkney Mainland to the north, Hoy, South Walls and Flotta to the west and south and Burray and South Ronaldsay to the east. The Flow is linked to the Pentland Firth on the south through the Sound of Hoxa, and to the Atlantic Ocean on the west through Hoy Sound.
148. The Scapa Flow SPA qualifies under Article 4.2 by regularly supporting populations of European importance of breeding seabirds, non-breeding seabirds and non-breeding waterfowl. The potential for LSE has been identified in relation to all eight qualifying features (**Table 4.2**), with the effect pathways associated with LSE for each of these detailed in **Table 2.1** and set out in the assessment below.
149. The conservation objectives of this SPA (as determined from NatureScot's SiteLink) are:
- To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status; and
 - To ensure that the integrity of the Scapa Flow SPA is restored in the context of environmental changes by meeting the following objectives for each qualifying feature:
 - The populations of the qualifying features are viable components of the site;
 - The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species; and
 - The supporting habitats and processes relevant to qualifying features and their prey resources are maintained at the Scapa Flow SPA.
150. The Bellrock WFDA does not overlap with the SPA, so the potential impacts on its qualifying features will only occur as a result of potential vessel movements through, or within the vicinity of, the SPA. This could arise as vessels transit between the WFDA and ports in Orkney. Other potential effects of the Bellrock WFDA on breeding and non-breeding seabird qualifying features of the Scapa Flow SPA will be encompassed by the assessments for the breeding seabird colony SPAs with which these features are associated (see **Section 4.4**), whilst the WFDA is well beyond 15 km from the SPA, which is the distance advised in NatureScot (2023f) guidance for considering impact pathways for other qualifying features of marine SPAs.

151. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objectives to ensure that populations of qualifying features are viable components of the site, and to ensure that the distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species, because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of these conservation objectives.

Table 4.3: Details on the Qualifying Features of the Scapa Flow SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Great-northern diver	Non-Breeding	Not Assessed	505 individuals	Yes
Black-throated diver	Non-Breeding	Not Assessed	57 individuals	Yes
Red-throated diver	Breeding	Favourable	76 pairs	Yes
Slavonian grebe	Non-Breeding	Not Assessed	135 individuals	Yes
Common eider	Non-Breeding	Not Assessed	1,997 individuals	Yes
Long-tailed duck	Non-Breeding	Not Assessed	1,395 individuals	Yes
Red-breasted merganser	Non-Breeding	Not Assessed	539 individuals	Yes
Shag	Non-breeding	Not Assessed	2,927 individuals	Yes

4.3.3.2 Project Alone: Construction and Decommissioning

4.3.3.2.1 Displacement/Disturbance

152. Displacement and disturbance for the Scapa Flow SPA is only relevant in the context of vessels moving through, or within the vicinity of, the SPA, when transiting between the potential ports (Section 6.5 of **Appendix 12.1: Navigational Risk Assessment (Volume IV)**) and the Bellrock WFDA during the eight-year site preparation and construction period. Therefore, considering the list of potential ports during this period, the worst-case scenario (and therefore the most precautionary approach) for the Scapa Flow SPA assessment would be to consider all construction vessels being based out of Orkney (Scapa) port, from which vessels transiting from this port would have to travel through the SPA to reach the Bellrock WFDA. The predicted levels of vessel and other activity during site preparation and construction of the Bellrock WFDA are described in **Section 3.1** above. The annual maximum number of site preparation and construction vessels transiting through the SPA will be 231 round trips per year. It is worth noting that the number of annual round trips varies between years depending on the activities taking place, but no more than the maximum of 231 annual vessel round trips will be exceeded. A total of 1,615 vessel round trips will occur during the maximum of eight years of site preparation and construction activity for Bellrock WFDA infrastructure (**Table 3.1**). See **Chapter 12: Shipping and Navigation (Volume II)** for more details on vessel types and movements.
153. The most sensitive species to direct disturbance and displacement in the Scapa Flow SPA are great northern diver, black-throated diver and red-throated diver. When using the marine

environment (and not at the breeding site), these species are considered to be highly sensitive to sources of vessel disturbance, all scoring 5 on the five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013). All other species screened in for assessment of the disturbance impact pathway have a sensitivity of 3 or less (Garthe and Hüppop, 2004, Furness et al. 2013).

154. The non-breeding great northern diver population present in the Scapa Flow SPA represents 20.2% of the GB great northern diver population (NatureScot, 2022b). Aerial survey results from 2022-2023 (Peters-Grundy et al. 2026) indicate an increasing population trend from the citation population which was a mean peak population derived from 1998/99-2006/7 counts (Lawson et al., 2015). There is limited information on the effects of disturbance and displacement on great northern divers, although they have been recorded taking evasive avoidance action at distances of several kilometres from approaching vessels (Jarrett et al. 2018). Density and observation maps of great northern diver in the Scapa Flow SPA show birds are widespread throughout the SPA, with particular concentrations along the western edge and in the central parts of Scapa Flow (Peters-Grundy et al. 2026).
155. The non-breeding black-throated diver population present in the Scapa Flow SPA represents 9.5% of the GB black-throated diver population (NatureScot, 2022b). Aerial survey results from 2022-2023 (Peters-Grundy et al. 2026) indicate a decreasing population trend from the citation population which was a mean peak population derived from 1998/99-2006/7 counts (Lawson et al., 2015). There is limited information on disturbance and displacement for black-throated diver, although they have been recorded as taking evasive avoidance action at distances of several kilometres from approaching vessels (Jarrett et al. 2018) and have been identified as sensitive to displacement associated with marine developments (Furness et al. 2013). Aerial survey, boat based and land-based observation data for black-throated diver within the SPA all show the birds as sparsely distributed and present around the edges of the SPA, close to the coastline of both mainland Orkney and the smaller islands within the SPA and absent from central parts of the SPA (Peters-Grundy et al. 2026).
156. The breeding red-throated diver populations that use the Scapa Flow SPA as a foraging area represent 6.1% of the GB red-throated diver population (NatureScot, 2022b). The citation population for the Scapa Flow SPA is based on the estimated number of pairs breeding on freshwater lochs and lochans within 10 km of the SPA (Black et al. 2015; NatureScot, 2022c), with this distance based on the mean maximum foraging range of breeding red-throated divers of 9 km (Woodward et al. 2019). As stated in **Table 4.1** above, the species is showing a favourable condition status at this SPA (NatureScot, 2022c). Studies have shown that red-throated divers are particularly susceptible to disturbance from vessels (Goodship and Furness, 2022), with evidence showing they can be flushed at an average distance of 600 m from an approaching vessel (Fliessbach et al. 2019). Maximum curvature analysis and predicted distribution maps of red-throated diver from 2014 data indicate they are likely to be distributed close to the coast, particularly in the western half of the SPA (Marine Scotland, 2025).
157. When comparing the distributions of the diver species to the baseline levels of vessel activity in the Scapa Flow SPA, the main concentrations of these species overlap with areas with higher densities of vessel traffic. Given the SPA covers a relatively small area, this overlap between the birds and

the vessel activity is not unexpected. Data from 2017-2023 indicate the highest densities of vessel traffic stretch from South Walls Island up the east coast of Hoy, covering Bring Deeps and up to Stromness on Mainland Orkney (Marine Scotland, 2025). There are also smaller areas of high densities of vessel traffic in the central parts of Scapa Flow. The worst-case scenario of 231 annual round trips by vessels associated with Bellrock WFDA through the Scapa Flow SPA is approximately equal to 1,155 hours of annual vessel activity. This is based on a precautionary estimation that assumes the vessels will be travelling at 6 knots (this is the recommended speed if close to marine wildlife (NatureScot, 2017c)) whilst transiting approximately 15 km across the SPA. From the vessel density data (Marine Scotland, 2025), it is estimated that there would be approximately 196,692 hours of vessel activity within the Scapa Flow SPA annually. From this we can deduce that the vessel activity associated with the Bellrock Wind Farm Infrastructure during construction would represent a 0.6% increase in the overall vessel activity within this SPA, based on the worst-case scenario.

158. The vessel route density data from the same time period (i.e. 2017 – 2023) show that the highest density of vessel routes in this SPA predominantly stretch from South Walls Island up the east coast of Hoy, covering Bring Deeps up to Stromness on Mainland Orkney. The straight of Hoxa between Flotta and South Ronaldsay also has a high density of vessel routes, which is presumably due to this being the widest and deepest approach to Scapa Flow (GPS Nautical Charts, 2026). The majority of these areas have between 200 and 800 vessel routes per square kilometre per year (Marine Scotland, 2025).
159. A VMNSP will be produced as primary (i.e., embedded) mitigation measure and will set out indicative transit corridors to the relevant ports, where this retains compliance with the Convention on International Regulations for Preventing Collisions at Sea (COLREGS), to minimise vessel volume in the areas outside of the agreed indicative transit corridors (see the **Outline VMNSP (Volume V)**). The worst-case design scenario laid out in **Table 3.1** also details the maximum number of vessels on site at any one time as 34, which in itself limits the number of transits possible in a given time period. As detailed in the **Outline VMNSP (Volume V)**, vessels associated with the Bellrock Wind Farm Infrastructure will, where practicable, adhere to the best practice guidance (NatureScot, 2017c) approach to minimise the risk of disturbance, by reducing vessel transit speeds and by maintaining speed and course.
160. As a result of the vessel details discussed above, it can be concluded that the levels of additional traffic that would potentially result from the construction of the Bellrock WFDA are within the expected levels of inter-annual fluctuation of vessel activity and would be undetectable against the existing levels of vessel activity in the Scapa Flow SPA. Given this in context of the data on species distribution and density, and vessel and route densities, it is concluded that the potential disturbance and displacement effects caused by vessels present due to the Bellrock WFDA during the construction and decommissioning phases are not expected to have an adverse effect on the great northern diver, black-throated diver and red-throated diver populations present in the Scapa Flow SPA. This conclusion can also be extrapolated to the remaining species screened in for assessment (**Table 2.1**) for the Scapa Flow SPA, on the basis of their expected lower sensitivity to disturbance which suggests that any effects would be less than for the three species assessed in detail above.

4.3.3.3 Project Alone: Operation and Maintenance

161. There are no ports listed for potential use during O&M that would result in potential LSE for any species in the Scapa Flow SPA (**Table 2.1**) therefore, impacts are not assessed for this phase. See Section 6.5 of **Appendix 12.1: Bellrock WFDA Navigational Risk Assessment (Volume IV)** for more detail on potential ports for O&M).

4.3.3.4 Site Conclusion

162. It is concluded that there is no potential for an adverse effect on any of the qualifying features of the Scapa Flow SPA for which the potential for LSE was identified due to the Bellrock WFDA alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Scapa Flow SPA.

4.4 Assessment of Potential Adverse Effects on Site Integrity: Breeding Seabird Colony SPAs

4.4.1 Buchan Ness to Collieston Coast SPA

4.4.1.1 European Site Information and Conservation Objectives

163. Buchan Ness to Collieston Coast SPA is a stretch of southeast facing cliff in Aberdeenshire, located approximately 113 km from the Bellrock WFDA. The boundary of the SPA follows the boundaries of Bullers of Buchan Coast SSSI and Collieston to Whinnyfold Coast SSSI, and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1998, with the marine extension classified in 2009.
164. Buchan Ness to Collieston Coast SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including five species named as component species (**Table 4.4**). The potential for LSE has been identified in relation to one of the five qualifying species (**Table 4.4**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
165. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.

166. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
167. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

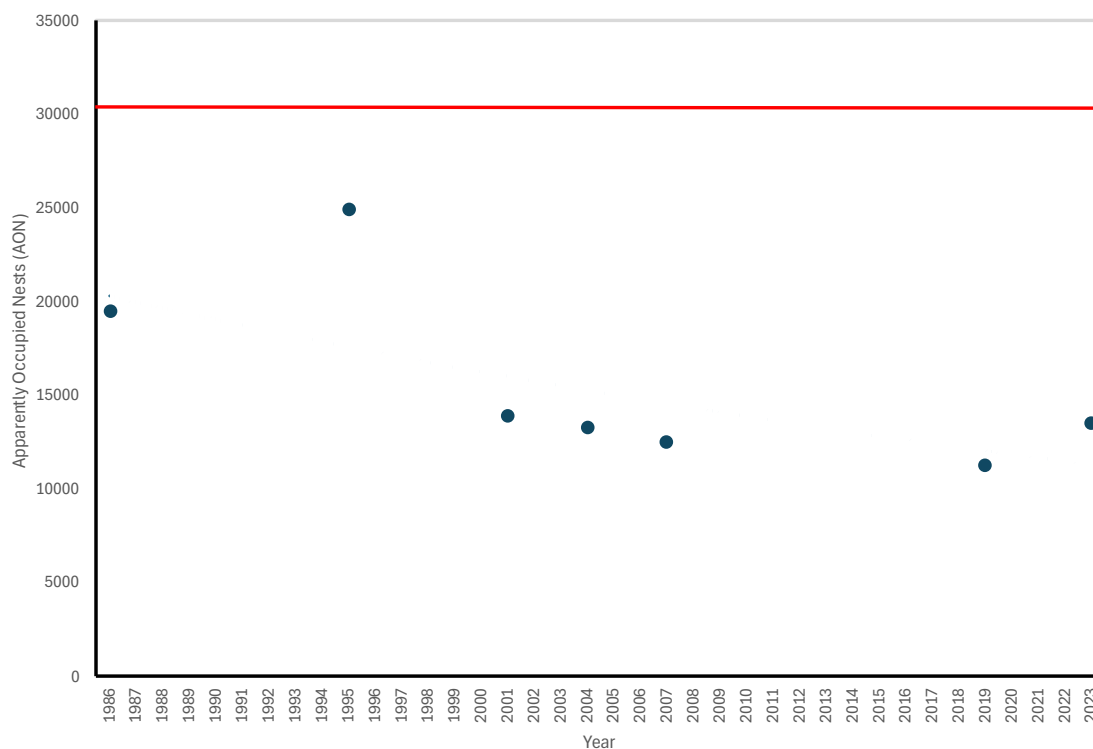
Table 4.4: Details on the Qualifying Features of the Buchan Ness to Collieston Coast SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable recovered	95,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable no change	30,452 pairs	Yes
Herring gull ¹	Breeding	Unfavourable declining	4,292 pairs	No
Guillemot ¹	Breeding	Favourable maintained	8,640 pairs	No
Fulmar ¹	Breeding	Unfavourable no change	1,045 pairs	No
Shag ¹	Breeding	Unfavourable recovering	1,765 pairs	No
Notes: ¹ Named component of the assemblage only.				

4.4.1.2 Assessment for the Kittiwake Population

168. The Buchan Ness to Collieston Coast SPA kittiwake population is currently estimated to number 13,547 Apparently Occupied Nests (AONs) (which is taken to equate to 27,094 individuals), based upon the most recently available count data from 2023 (JNCC and BTO, 2025). This is substantially below the citation level of 30,452 pairs (with pairs likely to be equivalent to AONs) (**Table 4.4**), but represents a small increase from the Seabirds Count estimate of 11,295 AONs which was made immediately prior to the advent of HPAI at UK seabird colonies (Burnell et al. 2023). The peak count from the data available on the SMP database (JNCC and BTO, 2025) is 24,957 AONs in 1995, with subsequent data suggesting a rapid decline to levels close to the current population size by the early 2000s (JNCC and BTO, 2025, **Plate 4.1**).

Plate 4.1: Kittiwake Population Trend at Buchan Ness to Collieston Coast SPA between 1986 and 2023. The Red Line Shows the Citation Population Size for the Buchan Ness to Collieston Coast SPA (30,452 pairs). Data are From the Seabird Monitoring Programme Database.



4.4.1.2.1 The Potential for Impacts on the Kittiwake Population

169. The Bellrock WFDA plus 2 km buffer does not overlap with the Buchan Ness to Collieston Coast SPA, so that potential impacts on its kittiwake population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site* because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this first Conservation Objective (as for *the maintain in the long term no significant disturbance of the species*, because disturbance would only be considered significant if it caused an adverse effect on the population viability of the qualifying features).
170. At a distance of 113 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Buchan Ness to Collieston Coast SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Buchan Ness to Collieston Coast SPA kittiwakes during the breeding season is likely to

be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Buchan Ness to Collieston Coast SPA at any given time (Cleasby et al. 2018).

171. Additionally, recent tracking studies at the Buchan Ness to Collieston Coast SPA (involving 12 individuals in 2023 and 25 in 2024) demonstrate little usage of the Bellrock WFDA, which was well beyond the maximum foraging range recorded in 2023 (i.e. 59.6 km) and well beyond areas of core usage, but within the outer areas of wider usage, in 2024 (as defined by the 50% and 95% utilisation distributions (UDs), respectively) (Bennett et al. 2025).
172. The apportioning calculations estimate that approximately 15% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, it is important to note that these calculations assume that all birds in adult plumage will be from breeding colonies, except for the nominal 10% assumed to be sabbaticals. As detailed in Section 3.2 of **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, this means that the proportion of kittiwakes on the Bellrock WFDA during the breeding season which are classed as breeding adults is highly likely to be overestimated. Furthermore, the method used to apportion birds to SPA breeding populations does not account for the likelihood that the high proportion of immature and other non-breeding kittiwakes present in the North Sea during the breeding season will be disproportionately represented in waters that are beyond the typical foraging ranges of birds from the breeding colonies (Furness 2015, MacArthur Green 2019). Therefore, it is highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Buchan Ness to Collieston Coast SPA is somewhat lower than the estimated 15%. The breeding season for kittiwake is defined as mid-April to August, following the NatureScot (2020b) guidance.
173. In the non-breeding season kittiwakes are largely pelagic, with birds from some UK colonies wintering as far west as the coast of eastern Canada (Frederiksen et al. 2012), although most of those which breed on the North Sea coast likely winter in the North Sea and Celtic Sea. Therefore, it is likely that there is the potential for birds from the Buchan Ness to Collieston Coast SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods (defined as September to December and January to mid-April, respectively, on the basis of applying the biologically defined minimum populations scale (BDMPS) defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
174. Given the above, the Bellrock WFDA may have potential effects on the Buchan Ness to Collieston Coast SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season).

4.4.1.2.2 *Project Alone: Construction and Decommissioning*

4.4.1.2.2.1 Disturbance

175. Direct disturbance to kittiwakes during the construction phase may arise within the Bellrock WFDA (and its immediate vicinity) as a result of increased vessel movements and helicopter activity, as well as from other activities directly associated with the installation of the wind turbines and other infrastructure. The levels of such activities that could arise are outlined in **Table 3.1**, with these activities occurring during construction campaigns within a construction period (including site preparation) of at most eight years duration.
176. A maximum total of 1,615 vessel round trips may occur over the construction phase (including site preparation), whilst it is estimated that a maximum of 34 vessels could occur within the area of the Bellrock WFDA at any one time (**Table 3.1**). This is within the context of the Bellrock WFDA and its immediate vicinity being subject to frequent vessel movements under existing, baseline, conditions, with the available data suggesting highest levels during the summer period (**Appendix 12.1: Bellrock WFDA Navigational Risk Assessment (Volume IV)**). In addition, a total of up to 816 helicopter round trips may occur during the construction phase.
177. When using the marine environment (and not at the breeding colony), kittiwakes are considered to have a relatively low sensitivity to such sources of direct disturbance. Thus, reviews of the sensitivity of different seabird species to disturbance from vessels and helicopter traffic assign kittiwake as '2' on a five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013).
178. The total area to be affected by such disturbance over the full (maximum) seven years of the construction phase also represents a small proportion of the total area of marine habitat available to kittiwakes from the Buchan Ness to Collieston Coast SPA. Thus, the Bellrock WFDA encompasses 280 km², representing approximately 0.2% of the total breeding season foraging area that is potentially available to the SPA kittiwake population, as defined by the generic measure of the species' mean maximum breeding season foraging range plus 1 Standard Deviation (SD) (i.e. 156.1±144.5 km - Woodward et al. 2019) and assuming that this range is represented by a semicircle to the seaward side of the colony. Similarly, the Bellrock WFDA represents just 0.7% of the breeding season foraging area if considering the mean maximum foraging range only. Furthermore, as outlined in **Section 4.4.1.2.1** above, tracking data (and the associated modelling of foraging distributions from such data) suggest little usage of the Bellrock WFDA by kittiwake from the Buchan Ness to Collieston Coast SPA during the breeding season (Cleasby et al. 2018, Bennett et al. 2025).
179. During the non-breeding periods, kittiwake distribution is not constrained by the location of the breeding colonies and birds from the SPA population are likely to occur across large expanses of oceanic and maritime waters (Frederiksen et al. 2012, Furness, 2015). Thus, the potential for effects of construction-related disturbance is generally lower than during the breeding season (but noting that in the case of the Buchan Ness to Collieston Coast SPA, the distance of the SPA from the Bellrock WFDA means that the likelihood of usage of the Bellrock WFDA by the SPA birds during the breeding season is also low and, hence, any such seasonal difference may be of limited extent).

180. In addition, it is important to consider that the construction activities will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, the activities will be concentrated within discrete (often small) parts of this wider area, and in any one location within the Bellrock WFDA they are unlikely to extend over the full duration of the construction phase, so further reducing the potential extent to which birds may be subject to disturbance effects.
181. The potential for disturbance effects during decommissioning is assumed to be similar to that for construction, noting that the duration of the decommissioning phase is not expected to exceed that of construction.
182. Given the low sensitivity of kittiwake to disturbance effects, the large distance of the Bellrock WFDA from the SPA (relative to the estimated kittiwake breeding season foraging range), the relatively small areas that will be subject to activities with the potential to result in disturbance at any given time during the construction period and the fact that these potential effects will be temporary, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population.

4.4.1.2.2.2 Displacement

183. As detailed above (**Section 4.4.1.2.2.1**), kittiwake is considered to have a low sensitivity to disturbance, whilst potential effects of disturbance during the construction and decommissioning phases will only extend across a small part of the wider foraging areas used by the Buchan Ness to Collieston Coast SPA kittiwake population and be limited to, at most, a seven year period during construction (and a likely similar or shorter period during decommissioning). Furthermore, as detailed above, potential effects of disturbance will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, at any given time, the potential for disturbance effects that could lead to displacement of kittiwakes from this SPA will be limited to relatively small areas, with the potential effects also being of a temporary nature.
184. Therefore, based upon the above, it is considered that there is relatively little potential for the Buchan Ness to Collieston Coast SPA kittiwake population to be affected by displacement during the construction or decommissioning phases, with any such effects only extending across relatively small areas and tending to be temporary in nature. Consequently, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population.

4.4.1.2.2.3 Changes to Prey Availability

185. Key prey species for kittiwakes include sandeel, *Ammodytes* spp. and sprat, *Sprattus sprattus* (del Hoyo et al. 1996). Indirect effects on kittiwakes may arise as a result of changes in the availability, distribution, or abundance of these species during the construction and decommissioning phases of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Buchan Ness to Collieston Coast SPA kittiwake population in the short-term.
186. During construction there are a number of ways in which effects on key prey species may occur. The installation of Wind Farm Infrastructure within the Bellrock WFDA may lead to temporary subtidal habitat loss/disturbance to as a result of a range of activities for seabed preparation

(including sand wave levelling (if required), boulder clearance and unexploded ordnance (UXO) clearance) for installation of the anchors and mooring lines and any required scour protection, subsea cable hubs, inter-array cables (IACs) and associated cable protection and ancillary equipment, all required for the installation of the FOU. There is the potential for temporary habitat loss/disturbance to affect up to 3.64 km² of seabed during the construction phase, which equates to just over 1% of the Bellrock WFDA. Activities will occur intermittently during the construction phase, with only a small proportion of the total footprint affected at any one time. Recovery of seabed habitats will commence immediately following installation of the Wind Farm Infrastructure allowing key prey species to repopulate the areas of previous disturbance (**Chapter 8: Fish and Shellfish Ecology (Volume II)**). Sandeel, *Ammodytes* spp. spawning grounds in particular are noted as having a high sensitivity to disturbance and habitat loss. On this basis, temporary habitat loss/disturbance to key prey species during the construction phase was assessed as having a minor adverse effect for sandeel, *Ammodytes* spp. but negligible adverse for sprat, *Sprattus sprattus* in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.

187. Increases in SSC and associated sediment redeposition may also reduce the abundance (i.e. limiting reproductive success) and localised distribution of fish (i.e. due to increased turbidity or loss of habitat). The installation of the FOU anchors and the installation of IACs may result in short-term avoidance of affected areas by fish. The realistic worst-case design scenario assessed in **Chapter 8: Fish and Shellfish Ecology (Volume II)** produced estimates of 1.37 km² for the maximum area (representing less than 0.5% of the area of the Bellrock WFDA), and 1,394,530 m³ for the maximum volume, of sediment disturbed during the construction phase. Thus, increased SSC and associated sediment redeposition will encroach on a very small part of the Bellrock WFDA, with occurrence limited to areas close to the footprint of seabed preparation for, and installation of anchors, IACs and subsea cable hubs as detailed in **Table 3.1**. Furthermore, such effects are also predicted to be temporary and will dissipate rapidly due to the hydrodynamic conditions present at the Bellrock WFDA, with such levels of disturbance considered to be well within the range of natural variability regularly experienced in dynamic offshore environments (as detailed in **Chapter 8: Fish and Shellfish Ecology (Volume II)**). Thus, such effects are concluded to have an effect of negligible adverse significance on the fish species receptors in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
188. Increases in SSC and associated reductions in water clarity may also affect the ability of foraging kittiwakes to locate fish at the sea surface, reducing the availability of key prey species. However, this is highly unlikely to be of importance to foraging kittiwakes because, as described above, these effects will extend across a small area, will be temporary in nature and are considered likely to be well within the range of natural variability regularly experienced at the Bellrock WFDA.
189. Further potential effects on the availability, distribution, or abundance of fish species that are prey for kittiwakes could arise via underwater noise due to construction activities. Underwater noise can potentially cause mortality, injury and behavioural responses amongst fish species and may be generated during the installation of the FOU anchors (up to 10% of these will be installed using pile driving), and by work vessels involved in the installation of IACs and WTGs (vessel noise). Risk of mortality or injury of fish species may be associated with piling operations; these will be limited to the piling for driven pile anchors and will be highly localised in its occurrence and limited to relatively short time periods during the construction phase. Additionally, the implementation of soft start procedures will allow fish to move away from the areas of highest noise levels, before the received noise reaches a level that would cause an injury, so substantially reducing the risk of mortality or

injury (**Chapter 8: Fish and Shellfish Ecology (Volume II)**). Overall, **Chapter 8: Fish and Shellfish Ecology (Volume II)** assesses the impact magnitude of underwater noise due to construction activities to be negligible for all fish receptors (including spawning and nurse grounds), with the significance of the effect being Minor Adverse.

190. The above considerations on the potential for indirect effects on the Buchan Ness to Collieston Coast SPA kittiwake population to arise due to changes in the availability, distribution, or abundance of prey species also need to be considered within the context that the Bellrock WFDA represents just 0.2% of the total breeding season foraging area that is potentially available to this population, and an even smaller percentage of the large expanses of sea potentially available to the population in the non-breeding periods (see **Section 4.4.1.2.2.1**).
191. Decommissioning impacts will be associated with the removal of the Bellrock WFDA infrastructure. While the precise decommissioning methodology will be finalised at a later stage, decommissioning is expected to result in impacts that are similar in nature to those identified for the construction phase, but generally lower in magnitude due to the reduced scale and shorter duration of activities. The potential for seabed disturbance during cable recovery will depend on the final technique selected (e.g. grapnel runs, cutting, or localised sediment removal). Despite the likelihood of impact magnitudes being reduced in comparison to those in construction, on a precautionary basis the **Chapter 8: Fish and Shellfish Ecology (Volume II)** concludes that the significance of decommissioning phase impacts are assessed to be the same as for the construction phase for physical disturbance and temporary habitat loss, increased SSCs and sediment re-deposition, and underwater noise and vibration.
192. Based upon the above, it is considered that there is little potential for the Buchan Ness to Collieston Coast SPA kittiwake population to be affected by changes to prey availability during the construction and decommissioning phases. Consequently, it is considered that there is no potential for construction or decommissioning related changes in prey availability to lead to an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population.

4.4.1.2.3 Project Alone: Operation and Maintenance

4.4.1.2.3.1 Disturbance

193. Vessel use and helicopter traffic within the Bellrock WFDA during the O&M phase may lead to direct disturbance of kittiwakes in a similar way as for the construction phase (see **Section 4.4.1.2.2.1**). The levels of such activities that could arise are outlined in **Table 3.1**.
194. Overall, the activity levels within the Bellrock WFDA are predicted to be considerably lower during O&M than during construction. The maximum number of return vessel trips is predicted to be 211 per year, which is below the levels predicted for the construction phase, whilst the range and extent of activities that would be undertaken within the WFDA is considerably more limited than during construction. Furthermore, the predicted level of vessel activity is within the context the Bellrock WFDA and its immediate vicinity being subject to frequent vessel movements under existing, baseline, conditions, with the available data suggesting highest levels during the summer period (**Appendix 12.1: Bellrock WFDA Navigational Risk Assessment (Volume IV)**). In addition to vessel trips, a total of up to 986 helicopter round trips per year may occur during the O&M phase, which would exceed levels predicted for the construction phase.

195. Given the low sensitivity of kittiwake to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.1.2.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population.

4.4.1.2.3.2 Displacement/Barrier Effects

196. The SNCB matrix approach provides the basis for estimating displacement effects on seabird species during the O&M phase in this assessment, with this approach assumed to also incorporate the impact of barrier effects within the estimates that are derived (SNCBs 2022, **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). Thus, throughout this section, mortality from displacement is assumed to refer to that which results from both displacement and barrier effects.
197. Displacement mortality is calculated using the peak population size (using the counts of birds on the water plus those in flight) for each of the relevant seasonal periods, averaged over the two years of baseline DAS, for the Bellrock WFDA and 2 km buffer (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV), Table 4.5**). A displacement rate is applied to each of the seasonally specific mean peak population sizes to estimate the numbers of displaced birds in each seasonal period, with an assumed mortality rate applied to those birds estimated to be displaced. The displacement and mortality rates used in this assessment follow NatureScot guidance (NatureScot, 2023d), and for kittiwake are:
- Breeding period: 30% displacement with lower and upper mortality rates of 1% and 3%; and
 - Non-breeding periods: 30% displacement with lower and upper mortality rates of 1% and 3%.
198. Estimates of kittiwake mortality were produced using the SNCB matrix and then apportioned to the Buchan Ness to Collieston Coast SPA kittiwake population during the breeding and non-breeding periods according to NatureScot's interim guidance and the BDMPS approach, respectively (NatureScot, 2018, Furness, 2015). The resulting mortality estimates for the breeding season were apportioned to age classes on the basis of the plumage characteristics of kittiwakes, as recorded during the breeding season in the baseline DAS, whilst for the non-breeding periods this was based on the ratio of adults to subadults as estimated for the relevant BDMPS population. Finally, it was assumed that 10% of the breeding adults miss breeding in any given year (i.e. sabbatical birds), so that the estimated adult mortality during the breeding season was adjusted accordingly. This approach is described in full in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, and follows the advice provided to the Applicant by NatureScot (**Table 1.1**).

Table 4.5: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Buchan Ness to Collieston Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.151	0.151	0.10
Autumn passage	94	N/A	0.018	0.011	N/A
Spring passage	84	N/A	0.024	0.011	N/A

199. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Buchan Ness to Collieston Coast SPA kittiwake population as a result of displacement is estimated to be 0.1 to 0.4 breeding adult birds and 0.01 to 0.04 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.6**). Approximately 90% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.6: Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.115	0.008
	Autumn passage	30%	1%	0.005	0.003
	Spring passage	30%	1%	0.007	0.003
	Annual total	-	-	0.127	0.014
Upper mortality estimate	Breeding	30%	3%	0.357	0.024
	Autumn passage	30%	3%	0.015	0.009
	Spring passage	30%	3%	0.019	0.008
	Annual total	-	-	0.390	0.041

200. The additional annual mortality of adult kittiwakes from the Buchan Ness to Collieston Coast SPA population predicted due to displacement from the Bellrock WFDA represents 0.0005% (lower estimate) to 0.0014% (upper estimate) of the current adult breeding population at this colony (i.e. 27,094 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the

potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of less than 0.01%.

201. Based upon the above, the potential levels of impact on the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.1.2.3.3 Collision Risk

202. Predictions of the number of kittiwakes at risk from collisions due to the Bellrock WFDA were calculated using the stochastic version of the Strategic Ornithology Support Services (SOSS) offshore collision risk model (CRM), as run in the Caneco (2022) shiny app⁴. For the purposes of this assessment, outputs from option 2 of the model are used, in accordance with NatureScot guidance (NatureScot, 2025), whilst the avoidance rate and species-specific input parameters were as advised by NatureScot (**Table 1.1**) and as detailed in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)**. The assessment is based upon the collision risk estimates for the worst-case design (**Table 3.1**).
203. Kittiwake collision estimates were calculated for the same seasonal periods as for the predicted displacement effects and then apportioned to the Buchan Ness to Collieston Coast SPA kittiwake population and to age classes exactly as for the displacement effects (see **Section 4.4.1.2.3.2**). The assumption that 10% of the breeding adults were sabbatical birds was also applied to the estimated adult mortality during the breeding season. This approach is described in full in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, and follows the advice provided to the Applicant by NatureScot (**Table 1.1**). Based upon the methods and assumptions above, the annual collision mortality for the worst-case design is predicted to be 1.6 adult and 0.18 subadult birds (**Table 4.7**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0061% of the current adult breeding population at this colony (i.e. 27,094 individuals) (Table 2.3 in **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.04%.

⁴ Models were also run in deterministic mode and for both the worst-case design and what is currently considered an alternative reasonable and creditable design, for which outputs are included in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)**.

Table 4.7: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Buchan Ness to Collieston Coast SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	1.495	0.100
Autumn passage	0.077	0.045
Spring passage	0.069	0.030
Annual total	1.641	0.176

204. Based upon the above, the potential levels of impact on the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.1.2.3.4 Combined Collisions and Displacement/Barrier Effects

205. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 1.77 and 2.03 adult and 0.19 and 0.22 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0065% to 0.0075% of the current adult breeding population at this colony (i.e. 27,094 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.04% and 0.05%.
206. Based upon the above, the potential levels of impact on the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.1.2.3.5 Changes to Prey Availability

207. Key prey species for kittiwakes include sandeel *Ammodytes* spp. and sprat, *Sprattus sprattus* (del Hoyo et al. 1996). As for the construction and decommissioning phases, indirect effects on kittiwakes may arise as a result of changes in the availability, distribution, or abundance of these species during the O&M phase of the Bellrock WFDA. Reduction or disruption to prey availability

may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Buchan Ness to Collieston Coast SPA kittiwake population.

208. O&M activities within the Bellrock WFDA, may result in temporary subtidal habitat loss or disturbance to key prey species for kittiwakes. This disturbance will primarily result from the interaction of mooring chains with the seabed, the use of jack-up vessels during component replacement, and IAC repair activities. The swept area generated by mooring line movement represents periodic or intermittent disturbance of the seabed, rather than permanent habitat loss (**Chapter 8: Fish and Shellfish Ecology (Volume II)**). There is potential for the temporary habitat loss/disturbance to affect a maximum of 1.36 km² per year (47.46 km² total over the 35 year O&M phase) (**Table 3.1**), which represents less than 0.5% of the Bellrock WFDA. Importantly, only a fraction of this disturbance is expected to occur at any one time, given the intermittent nature of operational activities. Recovery of seabed habitats is expected to commence immediately following the completion of O&M activities and associated vessels vacating the area, allowing key prey species to repopulate the areas of previous disturbance (**Chapter 8: Fish and Shellfish Ecology (Volume II)**). On this basis, temporary habitat loss/disturbance to key prey species during the O&M phase was assessed as having a negligible adverse effect in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
209. Increases in SSC and associated sediment redeposition may also reduce the feeding ability, reproductive success, abundance and localised distribution of fish. During the O&M phase, catenary mooring lines and IAC repairs may cause minor, localised seabed disturbance, leading to temporary increases in SSC. The realistic worst-case design scenario assessed in **Chapter 8: Fish and Shellfish Ecology (Volume II)** produced an estimated total of 25,525,500 m³ for the maximum volume of sediment disturbed during the O&M phase (35 years). However, it is important to note that this impact is spatially limited in the context of the wider habitats and populations. Unlike construction, O&M activities are less intensive and occur intermittently over a much longer timeframe, meaning the magnitude of any impact will be lower than during construction.
210. Increases in SSC and associated reductions in water clarity may also affect the ability of foraging kittiwakes to locate fish at the sea surface, reducing the availability of key prey species. However, this is highly unlikely because, as described above, these effects will extend across a small area, will be temporary in nature and are considered likely to be well within the range of natural variability regularly experienced at the Bellrock WFDA. Overall, SSC impacts on the key prey species for kittiwake are concluded to be negligible adverse in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
211. Underwater noise has the potential to arise from FOU operation, hydrodynamic movement of floating substructures (FSSs), and the tensioning and slackening of the station keeping systems (SKSs) during the O&M phase. This impact is relevant throughout the operational life of the Bellrock WFDA Infrastructure and has the potential to cause direct or indirect effects on key prey species for kittiwake. **Chapter 8: Fish and Shellfish Ecology (Volume II)** describes a low intensity, narrow frequency range and rapid attenuation of operational sounds from these sources. O&M vessels will contribute short-term, intermittent noise typical of standard marine traffic. Such events will be temporary, localised, and reversible, and will not materially influence the overall operational noise field. Overall, impacts associated with underwater noise have been assessed as having minor adverse effects on kittiwake key prey species in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.

212. Electromagnetic fields (EMFs) may arise due to the operation of IACs during the O&M phase. The conduction of electricity through subsea power cables will result in the emission of localised EMFs, which could potentially impact the sensory mechanisms of some species of fish and shellfish (**Chapter 8: Fish and Shellfish Ecology (Volume II)**). Target burial depth for buried IACs and rock protection for un-buried IACs will be used as embedded mitigation measures to ensure that a minimum distance between key prey species for kittiwake and EMFs associated with seabed cables are maintained, thereby reducing the maximum field strengths that receptors are exposed to and minimising potential behavioural or physiological effects. Overall, the impacts of EMFs on the key prey species for kittiwake have been assessed as having negligible adverse effects in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
213. During the O&M phase of the Bellrock WFDA there will be long term sub-tidal habitat loss and direct impacts to key prey species for kittiwake will occur as a result of the continuous physical presence of the Bellrock Wind Farm Infrastructure (anchors and scour protection, IACs and cable protection, and subsea cable hubs) on the seabed throughout the operational phase. Many species of fish are reliant upon the presence of suitable subtidal habitat for foraging, spawning and nursing. Any pre-existing habitat within the footprint of Bellrock Wind Farm Infrastructure on the seabed will be lost. As set out in **Table 3.1** the worst-case total area of permanent habitat loss is 2.82 km², which represents approximately 1% of the total area for the Bellrock WFDA. These areas of habitat loss will be discrete, in the immediate vicinity of seabed infrastructure, small, and isolated within large areas of broadscale seabed habitat. Therefore, this impact is considered to be highly localised and overall has been assessed to have a negligible adverse effect on the key prey species for kittiwake in **Chapter 8: Fish and Shellfish Ecology (Volume II)**.
214. Based upon the above, it is considered that there is little potential for the Buchan Ness to Collieston Coast SPA kittiwake population to be affected by changes to prey availability during the O&M phase. Consequently, it is considered that there is no potential for O&M related changes in prey availability to lead to an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population.

4.4.1.2.4 Project Alone Conclusion

215. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Buchan Ness to Collieston Coast SPA kittiwake population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.1.2.5 Effects In-combination

4.4.1.2.5.1 Effects of Relevance to the In-combination Assessment

216. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Buchan Ness to Collieston Coast SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
217. Therefore, the potential for effects of the Bellrock WFDA to act on the Buchan Ness to Collieston Coast SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.1.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

218. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Buchan Ness to Collieston Coast SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
219. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.7**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt OWF was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).
220. Full details of the displacement mortality estimates for the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Bellrock WFDA EIA Report Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.8**).

Table 4.8: Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	19.66	6.82
	Upper mortality estimate	48.58	20.46
Including Berwick Bank Wind Farm	Lower mortality estimate	21.91	7.61
	Upper mortality estimate	55.33	22.84
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

221. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from almost 20 to 49 breeding adult birds and seven to 20 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 22 to 55 adults and eight to 23 subadults (**Table 4.8**).
222. In terms of the additional annual mortality of adult birds, these estimates represent 0.07% (lower estimate) to 0.18% (upper estimate) of the current adult breeding population at this colony (i.e. 27,094 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.08% (lower estimate) to 0.20% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see **Table 2.9 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.50% to 1.23% (with the Berwick Bank Wind Farm effects excluded) and 0.55% to 1.40% (with the Berwick Bank Wind Farm effects included).
223. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm

Infrastructure in-combination with the other plans and projects. The population model for the SPA population was a stochastic, density independent, matrix model, based upon the demographic parameters specified in Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The starting population size was the 2023 count for the SPA (i.e. equivalent to 27,094 individuals), with the projected population trends considered over a 35 year timescale (the expected operational life of the Bellrock Wind Farm Infrastructure). The PVAs used a matched runs approach to compare the un-impacted (i.e. baseline) and impacted populations (such that the stochasticity in the demographic rates was applied to each simulation prior to applying the impacts) and productivity was assumed to be unaffected by the displacement effects on the adult and subadult age classes. The PVA modelling was undertaken using the Natural England nepva R package, as accessed via the web based Shiny tool, version 2 (Searle et al. 2019, NatureScot, 2023e). Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

224. Outputs from the PVAs are presented for the baseline scenario (i.e. no wind farm impacts) and for both the lower and upper ranges of the potential displacement mortality, as estimated with and without the effects from the Berwick Bank Wind Farm included. The outputs are summarised according to:

- Median population size at the end of the projection period;
- Median annual population growth rate;
- The counterfactual of population growth rate (CPGR) metric – defined as the median of the ratio of the annual growth rate of the impacted to un-impacted population, expressed as a proportion;
- The counterfactual for population size (CPS) metric - defined as the median of the ratio of the end-point size of the impacted to un-impacted population, expressed as a proportion; and
- Centile metric – defined as the centile of the un-impacted population that matches the median (i.e. 50th centile) of the impacted population.

225. Of the above, the CPGR, CPS and centile metrics are based upon comparisons of the impacted population relative to the baseline population, so that they are presented only for the impact scenarios. NatureScot guidance is that the CPGR and CPS metrics should be used for the interpretation of PVAs (NatureScot, 2023a), with these metrics shown to have relatively low sensitivity to factors such as varying population status and the misspecification of the demographic rates underpinning the population model (Cook and Robinson, 2015; Jitlal et al. 2017).

Table 4.9: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	114,728	1.0337	N/A	N/A	N/A

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Excluding Berwick Bank	Lower mortality estimate	112,357	1.0331	0.9994	0.9792	47.90
	Upper mortality estimate	108,618	1.0322	0.9985	0.9477	43.70
Including Berwick Bank	Lower mortality estimate	111,904	1.0330	0.9994	0.9773	47.44
	Upper mortality estimate	107,863	1.0319	0.9983	0.9406	42.72

226. The Berwick Bank Wind Farm was consented in June 2025, with the consent being dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations for which an adverse effect was concluded (or could not be excluded) (Marine Directorate 2025). The Buchan Ness to Collieston Coast SPA kittiwake population was amongst the populations for which such a conclusion was reached. Given the approach adopted in relation to the analogous situation with the Green Volt Wind Farm (see above), it is considered that the focus of this assessment should be on those outputs that exclude the predicted mortality from the Berwick Bank Wind Farm.
227. The predicted impacts resulting from the potential displacement effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects are small. With the effects from the Berwick Bank Wind Farm omitted, the CPS value for the upper mortality estimate indicates a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.15% (**Table 4.9**). As would be expected, the metrics for the lower mortality estimates indicate smaller effects still, with a reduction of just 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.06% in the annual population growth rate (relative to that predicted under baseline conditions).
228. In addition to projecting the PVAs over a 35 year period, 50 year projections were also undertaken in which the wind farm effects were incorporated for the first 35 years followed by a 15 year recovery period without any wind farm effects. In terms of the CPS and CPGR metrics, these 50 year projections gave very similar outputs to the 35 year projections for the displacement effects on the SPA kittiwake population. Thus, there were very small decreases in the predicted level of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% and 2% for the upper and lower displacement mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
229. Based upon the above, the potential levels of impact on the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects

associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.1.2.5.3 Collision Risk – Operation and Maintenance

230. As for the displacement effects (**Section 4.4.1.2.5.2**), estimates of the collision mortality attributed to the Buchan Ness to Collieston Coast SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot **Table 1.1**, and as described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.
231. The NEEOG Interim CEF project totals provide SPA-specific collision estimates by seasonal period for both the breeding adult and subadult age classes, in the same way as for displacement mortality estimates (except that a single value is derived, as opposed to lower and upper values). The collision totals used excluded the corrections for ‘as-built’ designs from MacArthur Green (2017) but were updated according to changes in the recommended model avoidance rates (noting that updates were applied only where the avoidance rates on which the original estimates were based could be established). As for displacement mortality (and in accordance with NatureScot advice) the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm, whilst the collision estimate for the Green Volt Wind Farm was excluded from all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).
232. Full details of the collision estimates for the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.10**).

Table 4.10: Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	67.26	32.00
Including Berwick Bank Wind Farm	77.61	34.99

233. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is an order of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 67 to 78 breeding adult birds and 32 to 35 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.10**).

234. In terms of the additional annual mortality of adult birds, these estimates represent 0.25% (Berwick Bank excluded) to 0.29% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 27,094 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.70% (Berwick Bank excluded) to 1.96% (Berwick Bank included).
235. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.11: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	114,728	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	106,107	1.0315	0.9979	0.9262	40.84
Including Berwick Bank	104,931	1.0312	0.9976	0.9161	39.74

236. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 7% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.21% (**Table 4.11**). As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects, the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the

reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 7% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

237. Based upon the above, the potential levels of impact on the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.1.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

238. The potential mortality attributed to the Buchan Ness to Collieston Coast SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.12**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.1.2.5.2** and **Section 4.4.1.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.12: Potential Annual Mortality of Buchan Ness to Collieston Coast SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	86.91	38.82
	Upper mortality estimate	115.83	52.46
Including Berwick Bank Wind Farm	Lower mortality estimate	99.51	42.60
	Upper mortality estimate	132.93	57.83
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.8 and Table 4.10 due to rounding errors.			

239. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 87 to 116 breeding adult birds and 39 to 52 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 100 to 133 adults and 43 to 58 subadults. These estimates represent 0.32% (lower estimate) to 0.43% (upper estimate) of the current adult breeding

population at this colony (i.e. 27,094 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.37% (lower estimate) to 0.49% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.20% to 2.93% (with the Berwick Bank Wind Farm effects excluded) and 2.53% to 3.36% (with the Berwick Bank Wind Farm effects included).

240. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.13** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 12% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.36% (**Table 4.13**). The metrics for the lower mortality estimates indicate reductions of 9% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.27% in the annual population growth rate.

Table 4.13: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Buchan Ness to Collieston Coast SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	114,728	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	103,973	1.0309	0.9973	0.9065	39.02
	Upper mortality estimate	100,407	1.0300	0.9964	0.8775	35.48
Including Berwick Bank	Lower mortality estimate	102,760	1.0305	0.9969	0.8951	37.76
	Upper mortality estimate	98,826	1.0294	0.9959	0.8614	34.18

241. As for the PVAs detailed in **Section 4.4.1.2.5.2** and **Section 4.4.1.2.5.3** above, the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 12% and 9% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.1.2.6 In-combination Conclusion

242. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Buchan Ness to Collieston Coast SPA kittiwake population is predicted to cause the population to be 12% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Buchan Ness to Collieston Coast SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

243. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the consistent, long term, decline of the Buchan Ness to Collieston Coast SPA kittiwake population and its 'unfavourable no change' condition status (**Table 4.4**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
244. Consequently, it is concluded that there is the potential for an adverse effect on the Buchan Ness to Collieston Coast SPA kittiwake population as a result of the Bellrock Wind Fram Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.1.3 Assessment for the Breeding Seabird Assemblage

245. The breeding seabird assemblage for the Buchan Ness to Collieston Coast SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 95,000 individual seabirds). Kittiwake is one of the five species identified in the citation as having nationally important populations which contribute to the Buchan Ness to Collieston Coast SPA breeding seabird assemblage.
246. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that kittiwake is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
247. The Buchan Ness to Collieston Coast SPA kittiwake population is currently estimated to number 13,547 AONs. Given the size of this population and the scale of the potential impacts, it is considered that there is no risk of this population being lost from the breeding seabird assemblage due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to kittiwake, it is concluded that the potential effect on the SPA kittiwake population would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage.
248. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Buchan Ness to Collieston Coast SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.1.4 Site Conclusion

249. It is concluded that the possibility of an adverse effect cannot be excluded for the Buchan Ness to Collieston Coast SPA population of breeding kittiwake. For the kittiwake population, the potential for an adverse effect arises from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA kittiwake population are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
250. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Buchan Ness to Collieston Coast SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.2 Fowlsheugh SPA

4.4.2.1 European Site Information and Conservation Objectives

251. Fowlsheugh SPA is a mainland seabird colony on the coast of Aberdeenshire, northeast Scotland. The SPA is approximately 47 km northwest of the Bellrock WFDA, and was classified in August 1992, with an additional 2 km marine extension to the site classified in September 2009. The SPA is underpinned by the Fowlsheugh SSSI.
252. Fowlsheugh SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including five species named only component species (**Table 4.14**). The potential for LSE has been identified in relation to two of the five qualifying species (**Table 4.14**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
253. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
254. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
255. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because

the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

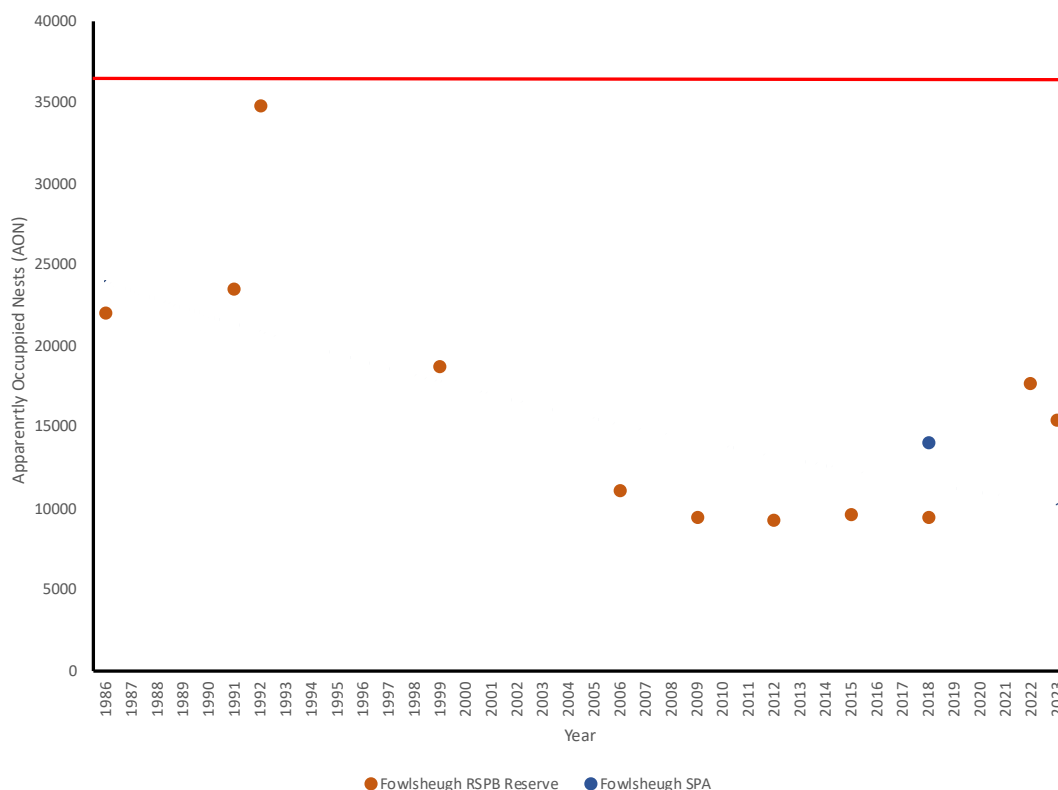
Table 4.14: Details on the Qualifying Features of the Fowlsheugh SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	145,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	36,650 pairs	Yes
Herring gull ¹	Breeding	Unfavourable, no change	3,190 pairs	No
Guillemot ¹	Breeding	Favourable maintained	56,450 individuals	No
Razorbill ¹	Breeding	Favourable maintained	5,800 individuals	Yes
Fulmar ¹	Breeding	Unfavourable declining	1,170 pairs	No
Notes:				
¹ Named component of the assemblage only				

4.4.2.2 Assessment for the Kittiwake Population

256. The most recent full survey of the Fowlsheugh SPA kittiwake population derives from 2018, at which time the population was estimated to number 14,039 AONs, equating to 28,078 individuals (Burnell et al. 2023, JNCC and BTO, 2025). Subsequent surveys in 2022 and 2023 of the RSPB reserve count sector within the SPA (which had held approximately 70% of the kittiwake recorded during the previous survey of the entire SPA) suggest a recent increase in the SPA population, with 15,483 AONs estimated in 2023 (Tremlett et al. 2024b, JNCC and BTO, 2025). However, the Seabirds Count estimate is used for the current assessment, on the basis that it derives from the most recent full survey of the SPA.
257. Irrespective of the apparent recent increase in the population since the Seabirds Count census, it is clear that the current population size is substantially below the citation level of 36,650 breeding pairs (with pairs likely to be equivalent to AONs) (**Table 4.14**). In terms of the long-term trends, the counts from the Fowlsheugh RSPB reserve count sector demonstrate that the SPA population has declined since designation in 1992, with the population size almost certainly below the citation level in all subsequent years for which data are available (**Plate 4.2**, source JNCC and BTO, 2025)). There is evidence of a levelling off in the population decline since the mid-2000s, with the counts from 2022 and 2023 giving a tenuous indication of possible (limited) recovery.

Plate 4.2 Kittiwake Population Trend at the Fowlsheugh RSPB Reserve between 1986 and 2023 (with this Site Accounting for 71% of the SPA Population Estimate in 2018). The 2018 Estimate for the Entire Fowlsheugh SPA is also Shown. The Red Line Shows the Citation Population Size for the SPA (36,650 pairs). Data are from the Seabird Monitoring Programme Database



4.4.2.2.1 The Potential for Impacts on the Kittiwake Population

258. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
259. At a distance of 122 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Fowlsheugh SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Fowlsheugh SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Fowlsheugh SPA at any given time (Cleasby et al. 2018). Additionally, tracking of 40 and 26 breeding kittiwakes from the Fowlsheugh SPA in 2021 and 2023,

respectively, demonstrated no usage of the Bellrock WFDA, which was well beyond the 82 km (2021) and 65 km (2023) mean maximum foraging ranges of the tracked birds (Bogdanova et al. 2022, 2025).

260. The apportioning calculations estimate that approximately 18% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Fowlsheugh SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Fowlsheugh SPA is somewhat lower than the estimated 18%.
261. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Fowlsheugh SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
262. Given the above, the Bellrock WFDA may have potential effects on the Fowlsheugh SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.2.2.2 Project Alone: Construction and Decommissioning

4.4.2.2.2.1 Disturbance

263. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fowlsheugh SPA is slightly further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little usage of the Bellrock WFDA during the breeding season by kittiwake from the Fowlsheugh SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
264. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Fowlsheugh SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Fowlsheugh SPA kittiwake population.

4.4.2.2.2.2 Displacement

265. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fowlsheugh SPA is slightly further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little usage of the Bellrock WFDA during the breeding season by kittiwake from the Fowlsheugh SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).

266. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Fowlsheugh SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Fowlsheugh SPA kittiwake population.

4.4.2.2.2.3 Changes to Prey Availability

267. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Fowlsheugh SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fowlsheugh SPA is slightly further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little usage of the Bellrock WFDA during the breeding season by kittiwake from the Fowlsheugh SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
268. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Fowlsheugh SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Fowlsheugh SPA kittiwake population.

4.4.2.2.3 Project Alone: Operation and Maintenance

4.4.2.2.3.1 Disturbance

269. The assessment of the potential effects of disturbance during the O&M phase on the Fowlsheugh SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fowlsheugh SPA is slightly further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little usage of the Bellrock WFDA during the breeding season by kittiwake from the Fowlsheugh SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
270. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Fowlsheugh SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Fowlsheugh SPA kittiwake population.

4.4.2.2.3.2 Displacement and Barrier Effects

271. The potential effects of displacement and barrier effects during the O&M phase on the Fowlsheugh SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Table 4.15** and **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). The resultant seasonal mortality estimates

were then apportioned to the Fowlsheugh SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.15**.

Table 4.15: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fowlsheugh SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.185	0.185	0.10
Autumn passage	94	N/A	0.014	0.008	N/A
Spring passage	84	N/A	0.018	0.008	N/A

272.

Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Fowlsheugh SPA kittiwake population as a result of displacement is estimated to be 0.2 to 0.5 breeding adult birds and 0.01 to 0.04 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.16**). Over 90% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.16: Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.141	0.010
	Autumn passage	30%	1%	0.004	0.002
	Spring passage	30%	1%	0.005	0.002
	Annual total	-	-	0.151	0.014
Upper mortality estimate	Breeding	30%	3%	0.440	0.030
	Autumn passage	30%	3%	0.011	0.006
	Spring passage	30%	3%	0.014	0.006
	Annual total	-	-	0.465	0.042

273. The additional annual mortality of adult kittiwakes from the Fowlsheugh SPA population predicted due to displacement from the Bellrock WFDA represents 0.0005% (lower estimate) to 0.0017% (upper estimate) of the current adult breeding population at this colony (i.e. 28,078 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of no more than 0.01%.
274. Based upon the above, the potential levels of impact on the Fowlsheugh SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.2.2.3.3 Collision Risk

275. The collision estimates for the Fowlsheugh SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Fowlsheugh SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
276. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 2.0 adult and 0.2 subadult birds (**Table 4.17**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0070% of the current adult breeding population at this colony (i.e. 28,078 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.05%.

Table 4.17: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fowlsheugh SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	1.843	0.124
Autumn passage	0.058	0.034
Spring passage	0.051	0.023
Annual total	1.952	0.180

277. Based upon the above, the potential levels of impact on the Fowlsheugh SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.2.2.3.4 Combined Collisions and Displacement/Barrier Effects

278. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 2.10 and 2.42 adult and 0.19 and 0.22 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0075% to 0.0086% of the current adult breeding population at this colony (i.e. 28,078 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.05% and 0.06%.
279. Based upon the above, the potential levels of impact on the Fowlsheugh SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.2.2.3.5 Changes to Prey Availability

280. The assessment of the potential effects of changes to prey availability during the O&M phase on the Fowlsheugh SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fowlsheugh SPA is slightly further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA is and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little usage of the

Bellrock WFDA during the breeding season by kittiwake from the Fowlsheugh SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).

281. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Fowlsheugh SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Fowlsheugh SPA kittiwake population.

4.4.2.2.4 Project Alone Conclusion

282. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Fowlsheugh SPA kittiwake population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.2.2.5 Effects In-combination

4.4.2.2.5.1 Effects of Relevance to the In-combination Assessment

283. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Fowlsheugh SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
284. Therefore, the potential for effects of the Bellrock WFDA to act on the Fowlsheugh SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.2.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

285. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Fowlsheugh SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
286. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.16**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt Wind Farm was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate, 2024).

287. Full details of the displacement mortality estimates for the Fowlsheugh SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.18**).

Table 4.18: Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	20.00	5.13
	Upper mortality estimate	60.00	15.39
Including Berwick Bank Wind Farm	Lower mortality estimate	30.69	6.07
	Upper mortality estimate	92.07	18.21
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

288. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 20 to 60 breeding adult birds and five to 15 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 31 to 92 adults and six to 18 subadults (**Table 4.18**).
289. In terms of the additional annual mortality of adult birds, these estimates represent 0.07% (lower estimate) to 0.21% (upper estimate) of the current adult breeding population at this colony (i.e. 28,078 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.11% (lower estimate) to 0.33% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology**

Population Viability Technical Report (Volume IV)), these estimates of additional mortality equate to an increase of 0.49% to 1.46% (with the Berwick Bank Wind Farm effects excluded) and 0.75% to 2.25% (with the Berwick Bank Wind Farm effects included).

290. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.19: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	129,248	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	126,794	1.0334	0.9995	0.9809	48.30
	Upper mortality estimate	121,898	1.0322	0.9984	0.9431	44.38
Including Berwick Bank	Lower mortality estimate	125,536	1.0331	0.9992	0.9716	47.24
	Upper mortality estimate	118,409	1.0314	0.9976	0.9167	41.56

291. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Fowlsheugh SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 6% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.16% (**Table 4.19**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.05% in the annual population growth rate.
292. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement

mortality to the Fowlsheugh SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 6% and 2% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

293. Based upon the above, the potential levels of impact on the Fowlsheugh SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.2.2.5.3 Collision Risk – Operation and Maintenance

294. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Fowlsheugh SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
295. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm, whilst the collision estimate for the Green Volt Wind Farm was excluded from all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate, 2024).
296. Full details of the collision estimates for the Fowlsheugh SPA kittiwake population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.20**).

Table 4.20: Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	89.11	25.70
Including Berwick Bank Wind Farm	160.65	30.14

297. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 89 to 161 breeding adult birds and 26 to 30 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.20**).
298. In terms of the additional annual mortality of adult birds, these estimates represent 0.32% (Berwick Bank excluded) to 0.57% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 28,078 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.17% (Berwick Bank excluded) to 3.92% (Berwick Bank included).
299. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.21: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	129,248	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	118,562	1.0314	0.9975	0.9150	41.70
Including Berwick Bank	111,197	1.0296	0.9958	0.8602	35.66

300. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Fowlsheugh SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 9%

in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.25% (**Table 4.21**).

301. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.2.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, which indicated a reduction of 8% in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
302. Based upon the above, the potential levels of impact on the Fowlsheugh SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.2.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

303. The potential mortality attributed to the Fowlsheugh SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is presented in **Table 4.22**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.2.2.5.2** and **Section 4.4.2.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.22: Potential Annual Mortality of Fowlsheugh SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	109.11	30.83
	Upper mortality estimate	149.11	41.09
Including Berwick Bank Wind Farm	Lower mortality estimate	191.33	36.21
	Upper mortality estimate	252.72	48.35
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.18 and Table 4.20 due to rounding errors.			

304. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 109 to 149 breeding adult birds and 31 to 41 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 191 to 253 adults and 36 to 48 subadults. These estimates represent 0.39% (lower estimate) to 0.53% (upper estimate) of the current adult breeding population at this colony (i.e. 28,078 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.68% (lower estimate) to 0.90% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.66% to 3.64% (with the Berwick Bank Wind Farm effects excluded) and 4.67% to 6.16% (with the Berwick Bank Wind Farm effects included).
305. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.23** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.41% (**Table 4.23**). The metrics for the lower mortality estimates indicate reductions of 10% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.30% in the annual population growth rate.

Table 4.23: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	129,248	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	115,941	1.0308	0.9970	0.8975	39.56
	Upper mortality estimate	111,390	1.0297	0.9959	0.8630	35.82
Including Berwick Bank	Lower mortality estimate	107,935	1.0288	0.9950	0.8352	32.94
	Upper mortality estimate	101,823	1.0271	0.9934	0.7883	27.76

306. As for the PVAs detailed in **Section 4.4.2.2.5.2** and **Section 4.4.2.2.5.3** (see also **Section 4.4.1.2.5.2**) above, the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 14% and 10% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.2.2.6 In-combination Conclusion

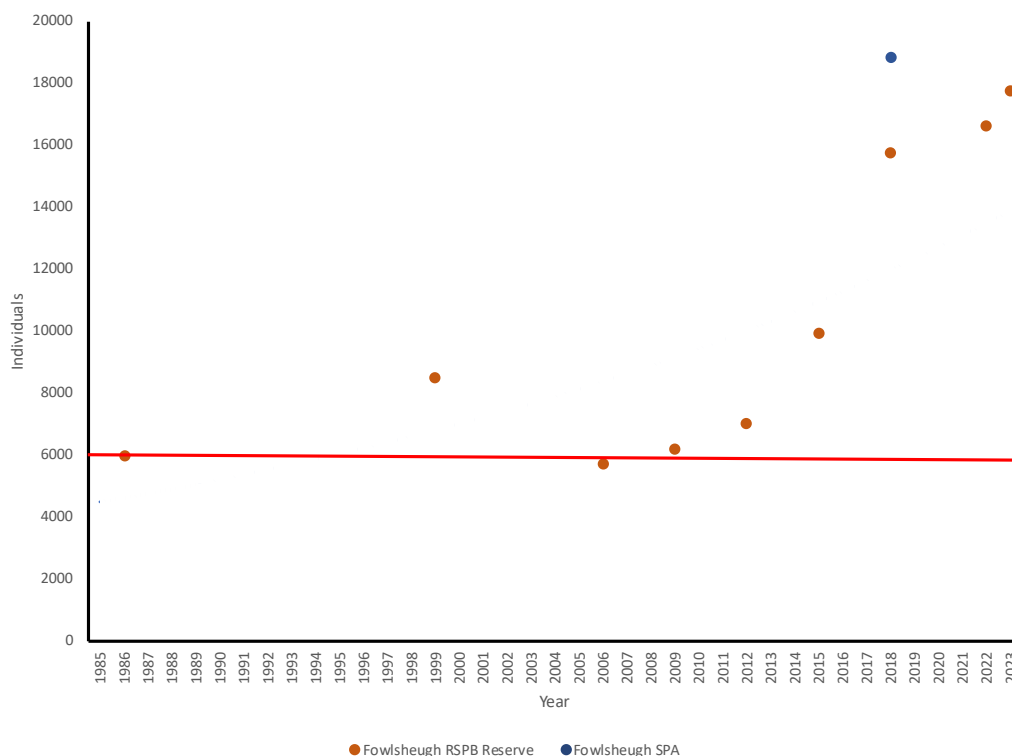
307. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Fowlsheugh SPA kittiwake population is predicted to cause the population to be up to 14% smaller by the end of the 35-year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Fowlsheugh SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

308. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the marked, long term, decline of the Fowlsheugh SPA kittiwake population (for which there is only tenuous indication of recent limited recovery) and its 'unfavourable declining' condition status (**Table 4.14**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
309. Consequently, it is concluded that there is the potential for an adverse effect on the Fowlsheugh SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.2.3 Assessment for the Razorbill Population

310. The Fowlsheugh SPA razorbill population is currently estimated to number 18,844 breeding individuals, which is substantially above the citation population size of 5,800 individuals (Burnell et al. 2023, **Plate 4.3**). As for the Fowlsheugh SPA kittiwakes, few earlier estimates of the size of the SPA razorbill population are readily available from SMP database because the data from one of the four seabird count sectors which comprise the SPA are not fully aligned with the SPA boundary, whilst there are few years with counts undertaken across the entire SPA (JNCC and BTO, 2025). However, it is apparent from the available data that the Fowlsheugh RSPB reserve holds the vast majority of the SPA population, with approximately 85% of the SPA population within this site based upon the Seabirds Count census data (Burnell et al. 2023, JNCC and BTO, 2025, **Plate 4.3**). The Seabirds Count estimate is used for the current assessment, on the basis that it derives from the most recent full survey of the SPA (although there are more recent counts available from the Fowlsheugh RSPB reserve).
311. The counts from the Fowlsheugh RSPB reserve suggest that the SPA razorbill population has shown a consistent and marked increase since at least the mid-2000s, with the counts from the Fowlsheugh RSPB reserve being above, or close to, the citation level in all years for which data are available (**Plate 4.3**).

Plate 4.3: Razorbill Population Trend at the Fowlsheugh RSPB Reserve Between 1986 and 2023 (Noting that this Site Accounts for a High Proportion of the SPA Population – see text). The Red Line Shows the Citation Population Size for the SPA (5,800 breeding individuals). The Number of Individuals is Calculated as the Count of Individuals from the Seabird Monitoring Programme Database Multiplied by 1.34



4.4.2.3.1 The Potential for Impacts on the Razorbill Population

312. The Bellrock WFDA plus 2 km buffer does not overlap with the Fowlsheugh SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site.*
313. At a distance of 122 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Fowlsheugh SPA is only just within the mean maximum plus one standard deviation of the breeding season foraging range (i.e. the metric used to determine breeding season connectivity) for razorbill when data from the Fair Isle colony are excluded (which is in accordance with NatureScot guidance for SPAs that are to the south of the Pentland Firth (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a)). As expected, this distance is also well beyond the mean breeding season foraging range of razorbill, even with the Fair Isle data included (61.3 km – Woodward et al. 2019). The fact that the Bellrock WFDA is only just within the distance used to determine breeding season connectivity and is well beyond the mean breeding season foraging range suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Fowlsheugh SPA razorbills during the breeding season is likely to be low. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of razorbill tracking data from a range of

UK colonies demonstrated that the Bellrock WFDA lies well beyond areas that are expected to be used by razorbills from the Fowlsheugh SPA (Cleasby et al. 2018).

314. The apportioning calculations estimate that approximately 72% of the razorbill occurring on the Bellrock WFDA during the breeding season derive from this SPA colony, although only 48% of these birds are assumed to be breeding adults (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). Importantly, the high breeding season apportionment estimate for the Fowlsheugh SPA razorbill population is an inevitable consequence of the small number of other razorbill colonies (all with substantially smaller population sizes than the Fowlsheugh SPA) which are considered to have connectivity with the Bellrock WFDA (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**).
315. Given that breeding season connectivity with the Fowlsheugh SPA population is, essentially, marginal and that the available tracking data suggest the Bellrock WFDA is well beyond the waters used by Fowlsheugh SPA razorbills during the breeding season, it seems highly likely that few birds from this SPA population will use the Bellrock WFDA and 2 km buffer during the breeding season. In this regard, it is notable that the estimated breeding season abundance of razorbill on the Bellrock WFDA and 2 km buffer is strongly skewed by the data from the July 2022 survey, when the estimated densities were an order of magnitude or more greater than during any other survey in the baseline DAS programme (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**). The July 2022 survey was characterised by a high occurrence of single adult-chick pairs, which comprised 21% of all razorbill records in this survey. This suggests that many of the birds recorded on the Bellrock WFDA plus 2 km buffer in July 2022 were in the post-breeding dispersal phase and, hence, may have derived from a wide range of colonies in eastern Scotland.
316. In the non-breeding season razorbills from Scottish colonies tend to move to central areas of the North Sea during the mid-winter period (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Fowlsheugh SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods, and potentially the winter period as well (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot - Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
317. Given the above, the Bellrock WFDA may have potential effects on the Fowlsheugh SPA razorbill population during breeding and non-breeding periods. However, based on the considerations outlined above, it seems likely that usage of the Bellrock WFDA and 2 km buffer (and hence the potential effects) will be extremely limited in the breeding season.

4.4.2.3.2 Project Alone: Construction and Decommissioning

4.4.2.3.2.1 Disturbance

318. Direct disturbance to razorbill during the construction phase may arise within the Bellrock WFDA (and its immediate vicinity) as a result of increased vessel movements and helicopter activity, as well as from other activities directly associated with the installation of the wind turbines and other infrastructure. The levels of such activities that could arise are outlined in **Table 3.1**, with the potential numbers of vessel and helicopter transits also summarised in **Section 4.4.1.2.2.1**). These

activities will occur during construction campaigns within a construction period (including site preparation) of at most eight years duration.

319. When using the marine environment (and not at the breeding colony), razorbills are considered to be moderately sensitive to such sources of direct disturbance. Thus, reviews of the sensitivity of different seabird species to disturbance from vessels and helicopter traffic assign razorbill as '3' on a five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013).
320. The total area to be affected by such disturbance over the full (maximum) seven years of the construction phase represents a small proportion of the total area of marine habitat available to razorbill from the Fowlsheugh SPA. Thus, the Bellrock WFDA encompasses 280 km², representing approximately 1.2% of the total breeding season foraging area that is potentially available to the SPA razorbill population, as defined by the species' mean maximum breeding season foraging range plus 1 SD, when the Fair Isle colony data are excluded (i.e. 73.8±48.4 km - NatureScot, 2023a, Woodward et al. 2019, **Section 4.4.2.3.1**) and assuming that this range is represented by a semicircle to the seaward side of the colony. As outlined in **Section 4.4.2.3.1** above, the Bellrock WFDA is also at the extremities of the potential breeding season foraging range of the SPA population (as defined by the mean maximum breeding season foraging range plus 1 SD), and would encompass none of the foraging range if this was defined by the mean maximum, as opposed to the mean maximum plus 1 SD, foraging range. Furthermore, modelling of breeding season foraging distributions from tracking data suggests that the Bellrock WFDA lies well beyond the areas that are expected to be used by razorbills from the Fowlsheugh SPA (Cleasby et al. 2018).
321. During the non-breeding periods, razorbill distribution is not constrained by the location of the breeding colonies and birds from the SPA population are likely to occur across large expanses of oceanic and maritime waters (Furness, 2015, Buckingham et al. 2022). Thus, the potential for effects of construction-related disturbance is generally lower than during the breeding season (but noting that in the case of the Fowlsheugh SPA, the distance of the SPA from the Bellrock WFDA means that the likelihood of usage of the Bellrock WFDA by the SPA birds during the breeding season is considered to be very low and, hence, any such seasonal difference may be of limited extent – see **Section 4.4.2.3.1**).
322. In addition, it is important to consider that the construction activities will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, the activities will be concentrated within discrete (often small) parts of this wider area, and in any one location within the Bellrock WFDA they are unlikely to extend over the full duration of the construction phase, so further reducing the potential to which birds may be subject to disturbance effects.
323. The potential for disturbance effects during decommissioning is assumed to be similar to that for construction, noting that the duration of the decommissioning phase is not expected to exceed that of construction.
324. Given the moderate sensitivity of razorbill to disturbance effects, the large distance of the Bellrock WFDA from the SPA (relative to the estimated razorbill breeding season foraging range), the

relatively small areas that will be subject to activities with the potential to result in disturbance at any given time during the construction period and the fact that these potential effects will be temporary, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.2.3.2.2 Displacement

325. As detailed above (**Section 4.4.2.3.2.1**), razorbill is considered to have a moderate sensitivity to disturbance, whilst potential effects of disturbance during the construction and decommissioning phases will only extend across a small part of the wider foraging range areas by the Fowlsheugh SPA razorbill population and be limited to, at most, a seven year period during construction (and a likely similar or shorter period during decommissioning). Furthermore, as detailed above, potential effects of disturbance will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, at any given time, the potential for disturbance effects that could lead to displacement of razorbills from this SPA will be limited to relatively small areas, with the potential effects also being of a temporary nature.
326. Therefore, based upon the above, it is considered that there is relatively little potential for the Fowlsheugh SPA razorbill population to be affected by displacement during the construction or decommissioning phases, with any such effects only extending across relatively small areas and tending to be temporary in nature. Consequently, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.2.3.2.3 Changes to Prey Availability

327. Sandeels, *Ammodytes* spp. are key prey for razorbills, with a range of other species taken including clupeids, *Clupeidae* spp. and gadids, *Gadidae* spp. (del Hoyo et al. 1996). Indirect effects on razorbills may arise as a result of changes in the availability, distribution, or abundance of these species during the construction and decommissioning phases of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Fowlsheugh SPA razorbill population in the short-term.
328. During construction there are a number of ways in which effects on razorbill prey species may occur, with the description and conclusions on the impacts of these being the same as outlined in **Section 4.4.1.2.2.3** for kittiwake prey species. However, the Bellrock WFDA represents less than 1.2% of the total breeding season foraging area that is potentially available to the Fowlsheugh SPA razorbill population (as defined in **Section 4.4.2.3.2.1** above) and is located at the extremities of the potential breeding season foraging range. In relation to the non-breeding periods, the Bellrock WFDA represents an even smaller percentage of the large expanses of sea potentially available to the population during these times. In addition, potential effects on prey availability during construction will be limited to a relatively small proportion of the Bellrock WFDA at any one time and in many instances such effects will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.2.3**).
329. As outlined in **Section 4.4.1.2.2.3**, during decommissioning, despite the likelihood of impact magnitudes being reduced in comparison to those in construction, on a precautionary basis the **Chapter 8: Fish and Shellfish Ecology (Volume II)** concludes that the magnitude of impact is

assessed to be the same as for the construction phase for physical disturbance and temporary habitat loss, increased SSCs and sediment re-deposition, and underwater noise and vibration.

330. Based upon the above, it is considered that there is little potential for the Fowlsheugh SPA razorbill population to be affected by changes to prey availability during the construction and decommissioning phases. Consequently, it is considered that there is no potential for construction or decommissioning related changes in prey availability to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.2.3.3 Project Alone: Operation and Maintenance

4.4.2.3.3.1 Disturbance

331. Vessel use and helicopter traffic within the Bellrock WFDA during the O&M phase may lead to direct disturbance of razorbill in a similar way as for the construction phase (see **Section 4.4.2.2.2**). The levels of such activities that could arise are outlined in **Table 3.1**.
332. Overall, the activity levels within the Bellrock WFDA are predicted to be considerably lower during O&M than during construction (with details of this presented in **Table 3.1** and summarised in **Section 4.4.1.2.3.1**).
333. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (NatureScot, 2023a, Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.2.3.3.2 Displacement/Barrier Effects

334. The SNCB matrix approach provides the basis for estimating displacement effects on seabird species during the O&M phase in this assessment, with this approach assumed to also incorporate the impact of barrier effects within the estimates that are derived (SNCBs 2022, **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). Thus, throughout this section, mortality from displacement is assumed to refer to that which results from both displacement and barrier effects.
335. Displacement mortality is calculated using the peak population size (using the counts of birds on the water plus those in flight) for each of the relevant seasonal periods, averaged over the two years of baseline DAS, for the Bellrock WFDA and 2 km buffer **Table 4.24** and **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). A displacement rate is applied to each of the seasonally specific mean peak population sizes to estimate the numbers of displaced birds in each seasonal period, with an assumed mortality rate applied to those birds estimated to be displaced. The displacement and mortality rates used in this assessment follow NatureScot guidance (NatureScot, 2023d), and for razorbill are:
- Breeding period: 60% displacement with lower and upper mortality rates of 3% and 5%; and
 - Non-breeding periods: 60% displacement with lower and upper mortality rates of 1% and 3%.

336. Estimates of razorbill mortality were produced using the SNCB matrix and then apportioned to the Fowlsheugh SPA razorbill population during the breeding and non-breeding periods according to NatureScot's interim guidance and the BDMPS approach, respectively (NatureScot, 2018, Furness, 2015). The resulting mortality estimates for the breeding season were apportioned to age classes on the basis of stable age distributions produced by population models, whilst for the non-breeding periods this was based on the ratio of adults to subadults as estimated for the relevant BDMPS population. Finally, it was assumed that 7% of the breeding adults miss breeding in any given year (i.e. sabbatical birds), so that the estimated adult mortality during the breeding season was adjusted accordingly. This approach is described in full in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, and follows the advice provided to the Applicant by NatureScot (**Table 1.1**).

Table 4.24: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fowlsheugh SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	0.724	0.724	0.07
Autumn passage	0	N/A	0.012	0.008	N/A
Winter	6	N/A	0.010	0.002	N/A
Spring passage	82	N/A	0.012	0.008	N/A

337. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Fowlsheugh SPA razorbill population as a result of displacement is estimated to be eight to 13 breeding adult birds and nine to 15 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.25**). Over 99% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.25: Potential Annual Mortality of Fowlsheugh SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	7.588	8.790
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.007	0.005
	Annual total	-	-	7.595	8.794
Upper mortality estimate	Breeding	60%	5%	12.647	14.649
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.001	0.000
	Spring passage	60%	3%	0.021	0.014
	Annual total	-	-	12.669	14.664

338. The additional annual mortality of adult razorbill from the Fowlsheugh SPA population predicted due to displacement from the Bellrock WFDA represents 0.0403% (lower estimate) to 0.0672% (upper estimate) of the current adult breeding population at this colony (i.e. 18,844 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents an increase in baseline mortality levels (i.e. without any wind farm impacts), which is more than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.38% to 0.64%.

339. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock WFDA alone. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.26: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure

Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	58,220	1.0250	N/A	N/A	N/A
Lower mortality estimate	57,272	1.0250	1.0000	0.9830	47.90
Upper mortality estimate	56,520	1.0240	0.9990	0.9720	46.50

340. The predicted impacts for the predicted displacement mortality due to the Bellrock WFDA alone are small, with the CPS value for the upper mortality estimate indicating a reduction of 3% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.10% (**Table 4.26**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), with no detectable change in the annual population growth rate (at least when the median CPGR value is expressed to four decimal places).
341. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Fowlsheugh SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave near equivalent outputs to the 35 year projections. Thus, when expressed to four decimal places, there were no differences in the CPS or CPGR values for the two projection periods (Table 3.1 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
342. Based upon the above, the potential levels of impact on the Fowlsheugh SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and would be inconsequential in population terms. It is also important to note that this conclusion derives from calculations in which virtually all of the predicted displacement mortality is attributable to the breeding season but, for the reasons outlined in **Section 4.4.2.3.1**, it is likely that usage of the Bellrock WFDA and 2 km buffer by Fowlsheugh SPA razorbills during the breeding season is overestimated, so that the predicted impacts to the SPA population are also likely to be overestimated. The extent to which the breeding season abundance estimates for the Bellrock WFDA and 2 km buffer are skewed by the data from the July 2022 DAS suggests that this overestimation is likely to be large (with omission of these data reducing the upper estimate of displacement mortality of adult razorbills from the Fowlsheugh SPA to less than one third of a bird per annum, compared to 12.67 as estimated in **Table 4.25**).

4.4.2.3.3.3 Secondary Entanglement

343. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through effects that could arise from debris and ghost fishing gear being caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Fowlsheugh SPA).
344. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Fowlsheugh SPA razorbill population as a result of secondary entanglement.

4.4.2.3.3.4 Changes to Prey Availability

345. Sandeels, *Ammodytes* spp. are key prey for razorbills, with a range of other species taken including clupeids, *Clupeidae* spp. and gadids, *Gadidae* spp. (del Hoyo et al. 1996). Indirect effects on razorbills may arise as a result of changes in the availability, distribution, or abundance of these species during the construction and decommissioning phases of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Fowlsheugh SPA razorbill population in the short-term.
346. During the O&M phase, there are a number of ways in which effects on razorbill prey species may occur, with these being the same as outlined in **Section 4.4.1.2.3.5** for kittiwake prey species. However, the Bellrock WFDA represents less than 1.2% of the total breeding season foraging area that is potentially available to the SPA razorbill population (as defined in **Section 4.4.2.3.2.1** above) and is located at the extremities of the potential breeding season foraging range. In relation to the non-breeding periods, the Bellrock WFDA represents an even smaller percentage of the large expanses of sea potentially available to the population during these times. In addition, potential effects on prey availability during O&M will be limited to a relatively small proportion of the Bellrock WFDA at any one time and some effects, such as disturbance and temporary habitat loss, and increased SSC will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.2.3**).
347. Based upon the above, it is considered that there is little potential for the Fowlsheugh SPA razorbill population to be affected by changes to prey availability during the O&M phase. Consequently, it is considered that there is no potential for O&M related changes in prey availability to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.2.3.4 Project Alone Conclusion

348. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Fowlsheugh SPA razorbill population are predicted to be small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.2.3.5 *Effects In-combination*

4.4.2.3.5.1 *Effects of Relevance to the In-combination Assessment*

349. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Fowlsheugh SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
350. Therefore, the potential for effects of the Bellrock WFDA to act on the Fowlsheugh SPA razorbill population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) effect pathway during O&M.

4.4.2.3.5.2 *Displacement/Barrier Effects*

351. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Fowlsheugh SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
352. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.25**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
353. Full details of the displacement mortality estimates for the Fowlsheugh SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.27**).

Table 4.27: Potential Annual Mortality of Fowlsheugh SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	74.41	58.43
	Upper mortality estimate	138.21	105.89
Including Berwick Bank Wind Farm	Lower mortality estimate	87.16	68.24
	Upper mortality estimate	161.12	123.31
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

354. The potential mortality on the Fowlsheugh SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is an order of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 74 to 138 breeding adult birds and 58 to 106 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 87 to 161 adults and 68 to 123 subadults (**Table 4.27**).
355. In terms of the additional annual mortality of adult birds, these estimates represent 0.39% (lower estimate) to 0.73% (upper estimate) of the current adult breeding population at this colony (i.e. 18,844 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.46% (lower estimate) to 0.86% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.76% to 6.99% (with the Berwick Bank Wind Farm effects excluded) and 4.41% to 8.14% (with the Berwick Bank Wind Farm effects included).

356. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.28: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fowlsheugh SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	58,220	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	50,352	1.0210	0.9960	0.8660	34.20
	Upper mortality estimate	44,618	1.0180	0.9930	0.7670	22.40
Including Berwick Bank	Lower mortality estimate	49,251	1.0200	0.9950	0.8450	31.90
	Upper mortality estimate	42,677	1.0160	0.9910	0.7330	19.00

357. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Fowlsheugh SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). Based on the predicted impacts for this in-combination scenario, the CPS value for the upper mortality estimate indicates a reduction of 23% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.7% (**Table 4.28**). The metrics for the lower mortality estimates indicate reductions of 13% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.4% in the annual population growth rate.

358. As for the PVAs undertaken for the potential displacement mortality to the Fowlsheugh SPA razorbill population from the Bellrock Wind Farm Infrastructure alone (**Section 4.4.2.3.3.2**), the additional PVAs for the displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were either very small decreases or no

differences in the predicted levels of impact (when the CPS and CPGR values were expressed to four decimal places), with the reductions in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remaining at 23% and 13% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.2.3.6 *In-combination Conclusion*

359. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Fowlsheugh SPA razorbill population is predicted to cause the population to be up to 23% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Fowlsheugh SPA razorbill) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.
360. Although the Fowlsheugh SPA razorbill population has shown a consistent, and marked, increasing trend since at least the mid-2000s and has a 'favourable maintained' condition status (**Table 4.14**), it is considered that the scale of the potential reduction in population size (relative to that predicted in the absence of any wind farm effects) is sufficient to mean that the potential for an adverse effect due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded.
361. In relation to this conclusion, it is important to consider whether the Bellrock WFDA contributes in any consequential way to the in-combination effects. Based on the estimates in **Table 4.25** and **Table 4.27**, the predicted displacement mortality for the Bellrock Wind Farm Infrastructure alone represents approximately 10% of the total in-combination mortality (for the scenario which excludes the Berwick Bank Wind Farm effects). However, as detailed above, it is likely that the baseline DAS data overestimate the abundance of Fowlsheugh SPA razorbills on the Bellrock WFDA and 2 km buffer during the breeding season. These estimates are strongly skewed by data from the July 2022 survey (with evidence that this survey was characterised by birds in the post-breeding dispersal phase – **Section 4.4.2.3.1**), and omission of the July 2022 data leads to greatly reduced estimates of displacement mortality (**Section 4.4.2.3.2**). Furthermore, the conclusion that an adverse effect on the Fowlsheugh SPA razorbill population due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded should also be considered within the context of the wider range of precautionary assumptions incorporated into the assessment of SPA razorbill populations (as detailed in **Section 4.2.2**).

4.4.2.4 **Assessment for the Breeding Seabird Assemblage**

362. The breeding seabird assemblage for the Fowlsheugh SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 145,000 seabirds). Razorbill and kittiwake comprise two of the five species

identified in the citation as having populations which are considered to be of European or national importance, and which contribute to the Fowlsheugh SPA breeding seabird assemblage.

363. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to both the SPA kittiwake and SPA razorbill populations, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that kittiwake and razorbill are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA process.
364. The Fowlsheugh SPA kittiwake population is currently estimated to number 14,039 AON and the SPA razorbill population is estimated to number 18,844 breeding individuals. Given the population sizes, and the scale of the potential impacts predicted in relation to each of these populations, it is considered that there is no risk of either population being lost from the breeding seabird assemblage as a result of the effects from the Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to kittiwake and razorbill, it is concluded that the potential effects on these two SPA populations would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage.
365. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Fowlsheugh SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.2.5 Site Conclusion

366. It is concluded that the possibility of an adverse effect cannot be excluded for the Fowlsheugh SPA populations of breeding kittiwake and breeding razorbill. For both the kittiwake and razorbill populations, the potential for an adverse effect arises from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA kittiwake and razorbill populations are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
367. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Fowlsheugh SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.3 St Abb's Head to Fast Castle SPA

4.4.3.1 European Site Information and Conservation Objectives

368. The St Abb's Head to Fast Castle SPA is located on the Berwickshire coast in southeast Scotland, at approximately 154 km from the Bellrock WFDA. The SPA was designated in 1997 and comprises an area of sea cliffs and coastal strip along which there are multiple seabird colonies, with a seaward extension (designated in 2009) which extends approximately 1 km into the marine environment.

369. St Abb's Head to Fast Castle SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including five species named as component species (**Table 4.29**). The potential for LSE has been identified in relation to one of the five qualifying species (**Table 4.29**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
370. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
371. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
372. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

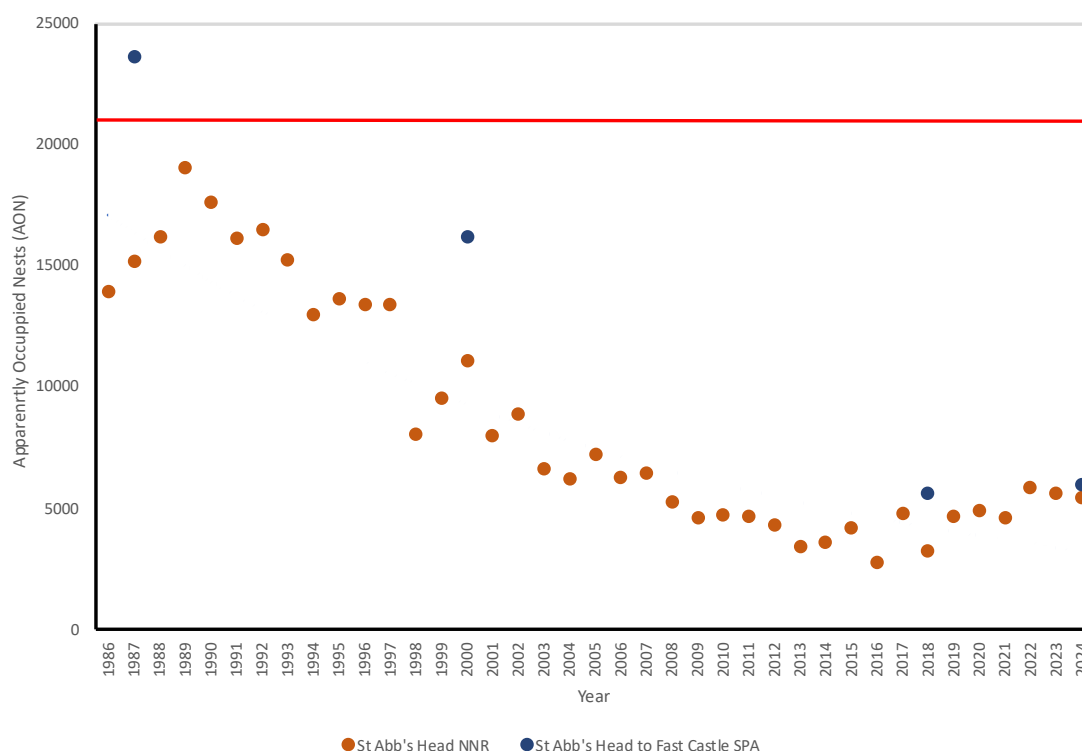
Table 4.29: Details on the Qualifying Features of the St Abb's Head to Fast Castle SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	79,560 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable recovering	21,170 pairs	Yes
Herring gull ¹	Breeding	Unfavourable recovering	1,160 pairs	No
Guillemot ¹	Breeding	Favourable maintained	31,750 individuals	No
Razorbill ¹	Breeding	Favourable maintained	2,180 individuals	No
Shag ¹	Breeding	Unfavourable recovering	560 pairs	No
Notes:				
¹ Named component of the assemblage only				

4.4.3.2 Assessment for the Kittiwake Population

373. The St Abb's Head to Fast Castle SPA kittiwake population is currently estimated to number 5,996 AONs (equating to 11,992 individuals), based upon the most recently available count data from 2024 (JNCC and BTO, 2025, **Plate 4.4**). The SPA population has been declining since before designation. The whole SPA has only been counted sporadically since 1985, but the main colony in the SPA (the St Abb's Head National Nature Reserve (NNR), which currently comprises approximately 90% of the current SPA population) is counted annually. The population size has been below the citation population size (**Table 4.29**) in all years for which count data are available after 1987 (**Plate 4.4**). The more recent counts provide tentative indications of recent stabilisation and limited increase in the SPA population size, albeit at a level well below the citation size.

Plate 4.4: Kittiwake Population Trend at the St Abb's Head NNR Between 1986 and 2024, with Four Counts for the Entire St Abb's Head to Fast Castle SPA also Shown. The Red Line Shows the Citation Population Size for the SPA (21,170 pairs). Data are from the Seabird Monitoring Programme Database



4.4.3.2.1 The Potential for Impacts on the Kittiwake Population

374. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.

375. At a distance of 154 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the St Abb's Head to Fast Castle SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to

determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by St Abb's Head to Fast Castle SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the St Abb's Head to Fast Castle SPA at any given time (Cleasby et al. 2018). Additionally, tracking of 37 and 34 breeding kittiwakes from the St Abb's Head to Fast Castle SPA in 2021 and 2023, respectively, demonstrated no usage of the Bellrock WFDA, which was well beyond the 64 km (2021) and 52 km (2023) mean maximum foraging range of the tracked birds (Bogdanova et al. 2022, 2025).

376. The apportioning calculations estimate that approximately 5% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by St Abb's Head to Fast Castle SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the St Abb's Head to Fast Castle SPA is somewhat lower than the estimated 5%.
377. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the St Abb's Head to Fast Castle SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
378. Given the above, the Bellrock WFDA may have potential effects on St Abb's Head to Fast Castle SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.3.2.2 Project Alone: Construction and Decommissioning

4.4.3.2.2.1 Disturbance

379. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the St Abb's Head to Fast Castle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the St Abb's Head to Fast Castle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the St Abb's Head to Fast Castle SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).

380. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the St Abb's Head to Fast Castle SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.3.2.2.2 Displacement

381. The assessment of the potential effects of displacement during the construction and decommissioning phases on the St Abb's Head to Fast Castle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the St Abb's Head to Fast Castle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the St Abb's Head to Fast Castle SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
382. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the St Abb's Head to Fast Castle SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.3.2.2.3 Changes to Prey Availability

383. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the St Abb's Head to Fast Castle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the St Abb's Head to Fast Castle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the St Abb's Head to Fast Castle SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
384. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the St Abb's Head to Fast Castle SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population.

4.4.3.2.3 *Project Alone: Operation and Maintenance*

4.4.3.2.3.1 Disturbance

385. The assessment of the potential effects of disturbance during the O&M phase on the St Abb's Head to Fast Castle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the St Abb's Head to Fast Castle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the

associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the St Abb's Head to Fast Castle SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).

386. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the St Abb's Head to Fast Castle SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population.

4.4.3.2.3.2 Displacement/Barrier Effects

387. The potential effects of displacement and barrier effects during the O&M phase on the St Abb's Head to Fast Castle SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (Bellrock WFDA EIA Report Appendix 10.3: Displacement Assessment Technical Report (Volume IV)). The resultant seasonal mortality estimates were then apportioned to the St Abb's Head to Fast Castle SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.30**.

Table 4.30: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the St Abb's Head and to Fast Castle SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.047	0.047	0.10
Autumn passage	94	N/A	0.005	0.003	N/A
Spring passage	84	N/A	0.007	0.003	N/A

388. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the St Abb's Head to Fast Castle SPA kittiwake population as a result of displacement is estimated to be 0.04 to 0.12 breeding adult birds and 0.00 to 0.01 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.31**). Over 85% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.31: Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.036	0.002
	Autumn passage	30%	1%	0.002	0.001
	Spring passage	30%	1%	0.002	0.001
	Annual total	-	-	0.039	0.004
Upper mortality estimate	Breeding	30%	3%	0.112	0.008
	Autumn passage	30%	3%	0.004	0.002
	Spring passage	30%	3%	0.005	0.002
	Annual total	-	-	0.121	0.012

389. The additional annual mortality of adult kittiwakes from the St Abb's Head to Fast Castle SPA population predicted due to displacement from the Bellrock WFDA represents 0.0003% (lower estimate) to 0.0010% (upper estimate) of the current adult breeding population at this colony (i.e. 11,992 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.007%.

390. Based upon the above, the potential levels of impact on the St Abb's Head to Fast Castle SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.3.2.3.3 Collision Risk

391. The collision estimates for the St Abb's Head to Fast Castle SPA kittiwake population due to the Bellrock Wind Farm Infrastructure alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the St Abb's Head to Fast Castle SPA and to the adult and subadult age classes, with account also made

for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

392. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.51 adult and 0.05 subadult birds (**Table 4.32**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.004% of the current adult breeding population at this colony (i.e. 11,992 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.029%.

Table 4.32: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the St Abb's Head to Fast Castle SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.468	0.032
Autumn passage	0.021	0.012
Spring passage	0.019	0.008
Annual total	0.508	0.052

393. Based upon the above, the potential levels of impact on the St Abb's Head to Fast Castle SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.3.2.3.4 Combined Collisions and Displacement/Barrier Effects

394. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.55 and 0.63 adult and of 0.06 subadult birds irrespective of the upper or lower estimate, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0046% to 0.0052% of the current adult breeding population at this colony (i.e. 11,992 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the

percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.031% and 0.036%.

395. Based upon the above, the potential levels of impact on the St Abb's Head to Fast Castle SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.3.2.3.5 Changes to Prey Availability

396. The assessment of the potential effects of changes to prey availability during the O&M phase on the St Abb's Head to Fast Castle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the St Abb's Head to Fast Castle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the St Abb's Head to Fast Castle SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
397. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the St Abb's Head to Fast Castle SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population.

4.4.3.2.4 Project Alone Conclusion

398. The potential effects from the Bellrock Wind Farm Infrastructure alone on the St Abb's Head to Fast Castle SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Although the potential additional mortality is extremely small, representing little more than one half of an adult bird, it is considered that within the context of the long term decline of this SPA population (and despite some indications of recent recovery), there is potential for this level of mortality to represent a meaningful addition to the in-combination effects from other plans and projects.

4.4.3.2.5 Effects In-combination

4.4.3.2.5.1 Effects of Relevance to the In-combination Assessment

399. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the St Abb's Head to Fast Castle SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly

localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

400. Therefore, the potential for effects of the Bellrock WFDA to act on the St Abb's Head to Fast Castle SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.3.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

401. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the St Abb's Head to Fast Castle SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
402. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.31**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
403. Full details of the displacement mortality estimates for the St Abb's Head to Fast Castle SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.33**).

Table 4.33: Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	6.66	1.65
	Upper mortality estimate	19.97	4.94
Including Berwick Bank Wind Farm	Lower mortality estimate	35.99	2.86
	Upper mortality estimate	107.97	8.59
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

404. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from seven to 20 breeding adult birds and two to five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 36 to 108 adults and three to nine subadults (**Table 4.33**).
405. In terms of the additional annual mortality of adult birds, these estimates represent 0.0555% (lower estimate) to 0.1665% (upper estimate) of the current adult breeding population at this colony (i.e. 11,992 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.3001% (lower estimate) to 0.9004% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.380% to 1.141% (with the Berwick Bank Wind Farm effects excluded) and 2.056% to 6.167% (with the Berwick Bank Wind Farm effects included).
406. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.34: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	49,814	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	48,826	1.0333	0.9996	0.9850	48.30
	Upper mortality estimate	47,635	1.0325	0.9987	0.9555	45.76

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Including Berwick Bank	Lower mortality estimate	46,130	1.0317	0.9980	0.9294	42.24
	Upper mortality estimate	39,886	1.0274	0.9939	0.8013	28.56

407. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 4% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.13% (**Table 4.34**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.04% in the annual population growth rate.
408. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the St Abb's Head to Fast Castle SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small changes (largely decreases) in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% and 2% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
409. Based upon the above, the potential levels of impact on the St Abb's Head to Fast Castle SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.3.2.5.3 Collision Risk – Operation and Maintenance

410. As described in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV), estimates of the collision mortality attributed to the St Abb's Head to Fast Castle SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).

411. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
412. Full details of the collision estimates for the St Abb's Head to Fast Castle SPA kittiwake population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.35**).

Table 4.35: Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	21.66	5.93
Including Berwick Bank Wind Farm	227.48	13.68

413. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is two to three orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 22 to 227 breeding adult birds and six to 14 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.35**).
414. In terms of the additional annual mortality of adult birds, these estimates represent 0.1807% (Berwick Bank excluded) to 1.8969% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 11,992 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.237% (Berwick Bank excluded) to 12.993% (Berwick Bank included).
415. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting

from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.36: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	49,814	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	47,270	1.0323	0.9986	0.9514	44.98
Including Berwick Bank	31,403	1.0207	0.9873	0.6307	11.66

416. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.14% (**Table 4.36**).
417. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.2.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
418. Based upon the above, the potential levels of impact on the St Abb's Head to Fast Castle SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.3.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

419. The potential mortality attributed to the St Abb's Head to Fast Castle SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure

In-combination with other plans and projects is presented in **Table 4.37**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.3.2.5.2** and **Section 4.4.3.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.37: Potential Annual Mortality of St Abb's Head to Fast Castle SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	28.32	7.58
	Upper mortality estimate	41.64	10.87
Including Berwick Bank Wind Farm	Lower mortality estimate	263.47	16.55
	Upper mortality estimate	335.45	22.27
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.33 and Table 4.35 due to rounding errors.			

420. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 28 to 42 breeding adult birds and eight to 11 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 263 to 335 adults and 17 to 22 subadults. These estimates represent 0.2362% (lower estimate) to 0.3472% (upper estimate) of the current adult breeding population at this colony (i.e. 11,992 individuals) with the Berwick Bank Wind Farm effects excluded, and 2.1971% (lower estimate) to 2.7973% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.618% to 2.378% (with the Berwick Bank Wind Farm effects excluded) and 15.048% to 19.160% (with the Berwick Bank Wind Farm effects included).

421. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.38** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details

of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 9% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.27% (**Table 4.38**). The metrics for the lower mortality estimates indicate reductions of 6% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.18% in the annual population growth rate.

Table 4.38: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the St Abb's Head to Fast Castle SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	49,814	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	46,434	1.0319	0.9982	0.9366	43.20
	Upper mortality estimate	45,190	1.0310	0.9973	0.9084	40.26
Including Berwick Bank	Lower mortality estimate	29,136	1.0185	0.9853	0.5860	8.32
	Upper mortality estimate	25,085	1.0143	0.9812	0.5053	4.02

422. As for the PVAs detailed in **Section 4.4.3.2.5.2** and **Section 4.4.3.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 9% and 6% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.3.2.6 In-combination Conclusion

423. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the St Abb's Head to Fast Castle SPA kittiwake population is predicted to cause the population to be up to 9% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper

level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the St Abb's Head to Fast Castle SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is also important to note that the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small, equating to little more than one half of an adult bird for the upper estimate.

424. The scale of the potential reduction in the size of the SPA population associated with the in-combination effects (relative to that predicted in the absence of any wind farm effects) is relatively small. Although the SPA population has undergone a marked, long term, decline (for which there is some indication of recent recovery) and has an 'unfavourable recovering' condition status (**Table 4.29**), it is considered that the level of the potential impact resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is insufficient to affect the status of this population.
425. Consequently, it is concluded that there is no potential for an adverse effect on the St Abb's Head to Fast Castle SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As noted above, the contribution of the Bellrock WFDA to the predicted impacts on the SPA population is extremely small. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.3.3 Assessment for the Breeding Seabird Assemblage

426. The breeding seabird assemblage for the St Abb's to Fast Castle SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 79,560 individual seabirds). Kittiwake is one of the five species identified in the citation as having nationally important populations which contribute to the St Abb's to Fast Castle SPA breeding seabird assemblage.
427. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA kittiwake population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that kittiwake is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
428. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the St Abb's to Fast Castle SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.3.4 Site Conclusion

429. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the St Abb's Head to Fast Castle SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the St Abb's Head to Fast Castle SPA.

4.4.4 Farne Islands SPA

4.4.4.1 European Site Information and Conservation Objectives

430. The Farne Islands SPA is a group of low-lying islands located two to eight kilometres off the coast of Northumberland in northeast England, approximately 154 km from the Bellrock WFDA. The Farne Islands was first classified as an SPA in 1985, with the surrounding marine environment protected by the Northumberland Marine SPA, which was classified in 2017 to protect the foraging areas of breeding seabirds.
431. The Farne Islands SPA qualifies under Article 4.1 by regularly supporting a population of European importance of four Annex I species (**Table 4.39**). It also qualifies under Article 4.2 by regularly supporting a population of European importance of one migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including four species named only as component species on the citation, but with a further six identified based upon advice provided to previous projects by Natural England (**Table 4.39**) (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**).
432. The potential for LSE has been identified in relation to three of the 15 qualifying features or named components of the seabird assemblage feature (**Table 4.39**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
433. The conservation objectives of this SPA (as determined through [Natural England's Access to Evidence](#)) are to:
- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
 - The extent and distribution of the habitats of the qualifying features;
 - The structure and function of the habitats of the qualifying features;
 - The supporting processes on which the habitats of the qualifying features rely;
 - The populations of each of the qualifying features; and
 - The distribution of qualifying features within the site.
434. Further information on this European Site, including the SACOs is available Natural England's Designated Sites View (Natural England, 2023a).

435. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
436. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.39: Details on the Qualifying Features of the Farne Islands SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Not available	163,819 individuals	Yes
Kittiwake ¹	Breeding	Not available	8,241 individuals	Yes
Sandwich tern	Breeding	Not available	1,724 individuals	No
Roseate tern	Breeding	Not available	26 individuals	No
Common tern	Breeding	Not available	366 individuals	No
Arctic tern	Breeding	Not available	4,006 individuals	No
Guillemot	Breeding	Not available	65,751 individuals	No
Puffin ¹	Breeding	Not available	76,798 individuals	Yes
Cormorant ¹	Breeding	Not available	230 individuals	No
Shag ¹	Breeding	Not available	1,677 individuals	No
Fulmar ²	Breeding	Not available	Not available	No
Black-headed gull ²	Breeding	Not available	Not available	No
Great black-backed gull ²	Breeding	Not available	Not available	No
Lesser black-backed gull ²	Breeding	Not available	Not available	No
Herring gull ²	Breeding	Not available	Not available	No
Razorbill ²	Breeding	Not available	Not available	No
Notes: ¹ Named component of the assemblage only. ² Named component of the assemblage only which are not identified on the citation but are included on the basis of Natural England advice to earlier projects (RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)).				

4.4.4.2 Assessment for the Kittiwake Population

437. The Farne Islands SPA kittiwake population is currently estimated to number 2,895 AONs (equating to 5,790 individuals), based upon the most recently available count data from 2024 (JNCC and BTO, 2025). The SPA population was estimated to number between approximately 12,000 to 12,500 birds during the early 1990s but had declined to 8,804 individuals by 2019 (Burnell et al. 2023). The further decline reflected in the most recent estimate means that the size of the SPA population is now below the citation level of 8,241 breeding individuals (**Table 4.39**).

4.4.4.2.1 The Potential for Impacts on the Kittiwake Population

438. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain and restore, the population of each of the qualifying features*'. In terms of the SACOs, this focus is most closely reflected in the attributes concerned with the abundance and diversity of the species assemblage which have the targets of maintaining; (i) the abundance of the breeding seabird assemblage qualifying feature at a level above 163,819 individuals, whilst avoiding deterioration from its current levels; and (ii) the species diversity of the breeding seabird assemblage qualifying feature (Natural England, 2023a).
439. At a distance of 154 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Farne Islands SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Farne Islands SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Farne Islands SPA at any given time (Cleasby et al. 2018).
440. The apportioning calculations estimate that approximately 4% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Farne Islands SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Farne Islands SPA is somewhat lower than the estimated 4%.
441. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Farne Islands SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
442. Given the above, the Bellrock WFDA may have potential effects on Farne Islands SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the

likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.4.2.2 Project Alone: Construction and Decommissioning

4.4.4.2.2.1 Disturbance

443. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Farne Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Farne Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Farne Islands SPA (Cleasby et al. 2018).
444. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Farne Islands SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.4.2.2.2 Displacement

445. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Farne Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Farne Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Farne Islands SPA (Cleasby et al. 2018).
446. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Farne Islands SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.4.2.2.3 Changes to Prey Availability

447. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Farne Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Farne Islands is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Farne Islands (Cleasby et al. 2018).
448. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Farne Islands SPA kittiwake population, it is considered that there is no potential for changes in

prey availability during the construction or decommissioning phases to lead to an adverse effect on the Farne Islands SPA kittiwake population.

4.4.4.2.3 *Project Alone: Operation and Maintenance*

4.4.4.2.3.1 Disturbance

449. The assessment of the potential effects of disturbance during the O&M phase on the Farne Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Farne Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Farne Islands SPA (Cleasby et al. 2018).
450. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Farne Islands SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Farne Islands SPA kittiwake population.

4.4.4.2.3.2 Displacement/Barrier Effects

451. The potential effects of displacement and barrier effects during the O&M phase on the Farne Islands SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). The resultant seasonal mortality estimates were then apportioned to the Farne Islands SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.40**.

Table 4.40: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Farne Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.040	0.040	0.1
Autumn passage	94	N/A	0.005	0.003	N/A
Spring passage	84	N/A	0.007	0.003	N/A

452. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Farne Islands SPA kittiwake population as a result of displacement is estimated to be 0.04 to

0.10 breeding adult birds and 0.00 to 0.01 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.41**). Approximately 85% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.41: Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.031	0.002
	Autumn passage	30%	1%	0.002	0.001
	Spring passage	30%	1%	0.002	0.001
	Annual total	-	-	0.035	0.004
Upper mortality estimate	Breeding	30%	3%	0.095	0.006
	Autumn passage	30%	3%	0.004	0.002
	Spring passage	30%	3%	0.005	0.002
	Annual total	-	-	0.104	0.011

453. The additional annual mortality of adult kittiwakes from the Farne Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0006% (lower estimate) to 0.0018% (upper estimate) of the current adult breeding population at this colony (i.e. 5,790 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.004% and 0.012%.

454. Based upon the above, the potential levels of impact on the Farne Islands SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.4.2.3.3 Collision Risk

455. The collision estimates for the Farne Islands SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston

Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Farne Islands SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

456. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.44 adult and 0.05 subadult birds (**Table 4.42**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0018% of the current adult breeding population at this colony (i.e. 5,790 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.052%.

Table 4.42: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Farne Islands SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.399	0.027
Autumn passage	0.021	0.012
Spring passage	0.019	0.008
Annual total	0.439	0.048

457. Based upon the above, the potential levels of impact on the Farne Islands SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.4.2.3.4 Combined Collisions and Displacement/Barrier Effects

458. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.47 and 0.54 adult and 0.05 and 0.06 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This

potential additional mortality of adult birds represents 0.0076% to 0.0094% of the current adult breeding population at this colony (i.e. 5,790 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.056% and 0.064%.

459. Based upon the above, the potential levels of impact on the Farne Islands SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.4.2.3.5 Changes to Prey Availability

460. The assessment of the potential effects of changes to prey availability during the O&M phase on the Farne Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Farne Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Farne Islands SPA (Cleasby et al. 2018).
461. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Farne Islands SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Farne Islands SPA kittiwake population.

4.4.4.2.4 Project Alone Conclusion

462. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Farne Islands SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Although the potential additional mortality is extremely small, representing approximately one half of an adult bird, it is considered that within the context of the current small size of this SPA population (i.e. 5,790 adult birds) and its ongoing, marked, decline, there is potential for this level of mortality to represent a meaningful addition to the in-combination effects from other plans and projects.

4.4.4.2.5 *Effects In-combination*

4.4.4.2.5.1 *Effects of Relevance to the In-combination Assessment*

463. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Farne Islands SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
464. Therefore, the potential for effects of the Bellrock WFDA to act on the Farne Islands SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.4.2.5.2 *Displacement/Barrier Effects – Operation and Maintenance*

465. As described in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV), estimates of the displacement mortality attributed to the Farne Islands SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
466. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (Table 4.41), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind (**Table 1.1**).
467. Full details of the displacement mortality estimates for the Farne Islands SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.43**).

Table 4.43: Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	3.63	1.47
	Upper mortality estimate	10.89	4.40
Including Berwick Bank Wind Farm	Lower mortality estimate	6.57	1.78
	Upper mortality estimate	19.71	5.35
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

468. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from four to 11 breeding adult birds and one to four subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are seven to 20 adults and two to five subadults (**Table 4.43**).
469. In terms of the additional annual mortality of adult birds, these estimates represent 0.0627% (lower estimate) to 0.1881% (upper estimate) of the current adult breeding population at this colony (i.e. 5,790 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1134% (lower estimate) to 0.3404% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.429% to 1.288% (with the Berwick Bank Wind Farm effects excluded) and 0.777% to 2.331% (with the Berwick Bank Wind Farm effects included).
470. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was

undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.44: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	24,009	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	23,526	1.0332	0.9995	0.9815	48.32
	Upper mortality estimate	22,749	1.0322	0.9984	0.9458	44.52
Including Berwick Bank	Lower mortality estimate	23,235	1.0330	0.9991	0.9687	46.96
	Upper mortality estimate	21,830	1.0311	0.9974	0.9097	40.44

471. No adverse effect on the Farne Islands SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 9% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.26% (**Table 4.44**). The metrics for the lower mortality estimates indicate reductions of 3% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.09% in the annual population growth rate.

472. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Farne Islands SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm

effects) remained at 9% and 3% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

473. Based upon the above, the potential levels of impact on the Farne Islands SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.4.2.5.3 Collision Risk – Operation and Maintenance

474. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Farne Islands SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
475. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
476. Full details of the collision estimates for the Farne Islands SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.45**).

Table 4.45: Potential Annual Mortality of Farne Islands SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	14.96	5.07
Including Berwick Bank Wind Farm	34.10	6.43

477. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 15 to 34 breeding adult birds and five to six subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.45**).

478. In terms of the additional annual mortality of adult birds, these estimates represent 0.26% (Berwick Bank excluded) to 0.59% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 5,790 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.77% (Berwick Bank excluded) to 4.03% (Berwick Bank included).

479. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.46: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	24,009	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	22,269	1.0316	0.9979	0.9290	42.38
Including Berwick Bank	20,580	1.0294	0.9957	0.8559	34.82

480. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Farne Islands SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.43% (**Table 4.46**).

481. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.4.2.5.2**), the additional

PVAs for the collision mortality to the Farne Islands SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 14% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

482. The scale of the potential reduction in the size of the Farnes Islands SPA population associated with the in-combination collision mortality should be considered within the context of the marked decline in the population since the early 1990s, with the population now below the citation level (**Table 4.39**). Given this, it is concluded that the possibility of an adverse effect on the SPA population as a result of the predicted collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects cannot be excluded.

4.4.4.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

483. The potential mortality attributed to the Farne Islands SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.47**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.4.2.5.2** and **Section 4.4.4.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.47: Potential Annual Mortality of Farne Islands SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	18.59	6.54
	Upper mortality estimate	25.85	9.47
Including Berwick Bank Wind Farm	Lower mortality estimate	40.67	8.22
	Upper mortality estimate	53.81	11.79
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.43 and Table 4.45 due to rounding errors.			

484. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges

from 19 to 26 breeding adult birds and seven to nine subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 41 to 54 adults and eight to 12 subadults. These estimates represent 0.32% (lower estimate) to 0.45% (upper estimate) of the current adult breeding population at this colony (i.e. 5,790 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.7% (lower estimate) to 0.93% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**) noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.20% to 3.06% (with the Berwick Bank Wind Farm effects excluded) and 4.81% to 6.37% (with the Berwick Bank Wind Farm effects included).

485. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.48** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 22% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.69% (**Table 4.48**). The metrics for the lower mortality estimates indicate reductions of 17% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.52% in the annual population growth rate.

Table 4.48: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	24,009	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	21,844	1.0311	0.9974	0.9112	40.46
	Upper mortality estimate	21,025	1.0300	0.9964	0.8783	36.64
Including Berwick Bank	Lower mortality estimate	19,873	1.0284	0.9948	0.8295	31.92
	Upper mortality estimate	18,686	1.0266	0.9931	0.7793	26.30

486. As for the PVAs detailed in **Section 4.4.4.2.5.2** and **Section 4.4.4.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined collision and displacement mortality to the Farne Islands SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 22% and 17% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.4.2.6 In-combination Conclusion

487. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Farne Islands SPA kittiwake population is predicted to cause the population to be up to 22% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Farne Islands SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm and therefore there is no provision for compensation to offset the predicted mortality from this project on the Farne Islands SPA kittiwake population (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this. It is also important to note that the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small, equating to approximately one half of an adult bird for the upper estimate.
488. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the marked decline in the population since the early 1990s, with the population now below the citation level (**Table 4.39**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and collision mortality alone, but not in relation to the displacement mortality alone, when considering the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.
489. Consequently, it is concluded that there is the potential for an adverse effect on the Farne Islands kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As noted above, the contribution of the Bellrock WFDA to the predicted impacts on the SPA population is extremely small. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

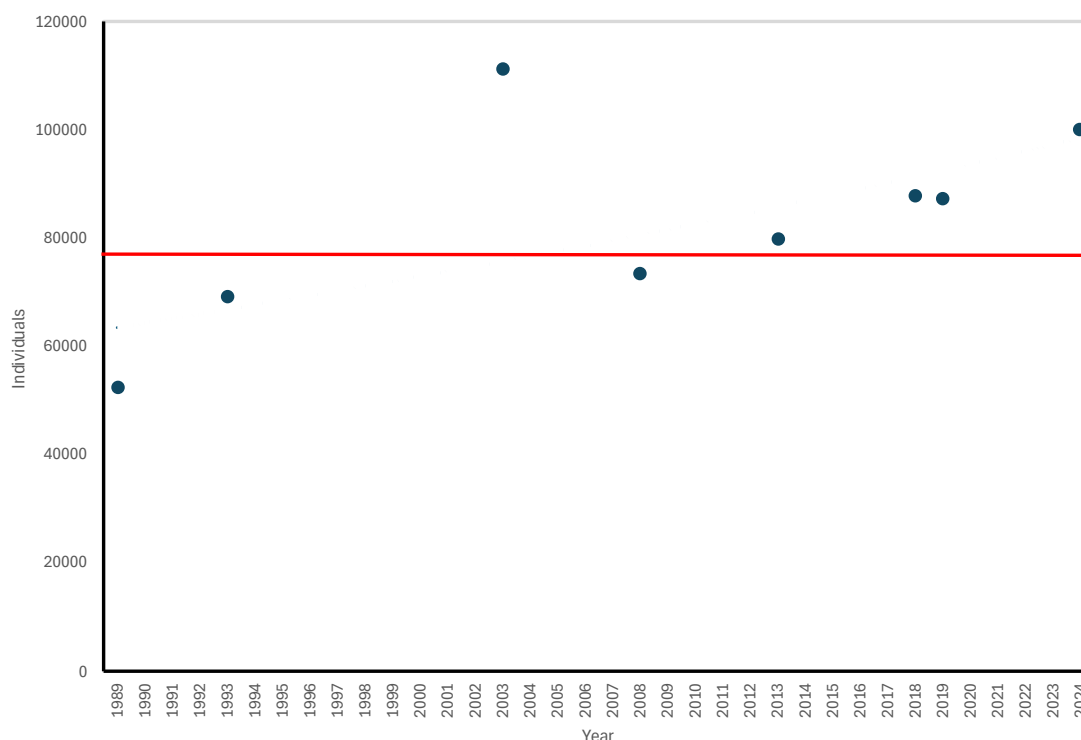
4.4.4.3 Assessment for the Puffin Population

490. Puffins are burrow nesting colonial seabirds that occur around the coasts of the North Atlantic region, mostly on islands. In Europe, colonies occur along the Atlantic coasts of Brittany, Britain and Ireland, Faroes, Iceland, Norway and Russia. They forage entirely at sea, diving for small

shoaling fish, particularly *Ammodytidae*, *Clupeidae* and *Gadidae* (Mitchell et al. 2004). In winter, puffins are very widespread across northwest European seas (Stone et al. 1995) and the Atlantic (Jessopp et al. 2013).

491. Based upon the most recently available count data from 2024, the Farne Islands SPA puffin population is currently estimated to number 50,103 Apparently Occupied Burrows (AOB), which is taken to equate to 100,206 individuals (JNCC and BTO, 2025). This is above the citation level (**Table 4.39**) and represents a substantial increase from the earliest count available on the SMP database for the SPA population, which estimated 52,658 individuals in 1989 (JNCC and BTO, 2025). Since 1989, the available count data indicate that numbers increased to a peak in the early 2000s (with 111,348 individuals in 2003) followed by a marked decline to 73,670 in 2008, since when there has been a steady increase to the current level (**Plate 4.5**).

Plate 4.5: Puffin Population Trend at Farne Islands SPA Between 1989 and 2024. The Red Line Shows the Citation Population Size for the SPA (76,798 individuals). Data are from the Seabird Monitoring Programme Database



4.4.4.3.1 The Potential for Impacts on the Puffin Population

492. The Bellrock WFDA plus two-kilometre buffer does not overlap with the Farne Islands SPA, so that potential impacts on its puffin population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective 'to maintain and restore, the population of each of the qualifying features' because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary. In terms of the SACOs, this focus is most closely reflected in the attributes concerned with the abundance and diversity of the

species assemblage which have the targets of maintaining; (i) the abundance of the breeding seabird assemblage qualifying feature at a level above 163,819 individuals, whilst avoiding deterioration from its current levels; and (ii) the species diversity of the breeding seabird assemblage qualifying feature (Natural England, 2023a).

493. At a distance of 154 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Farne Islands SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for puffin, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of puffin (62.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and two-kilometre buffer by Farne Islands SPA puffins during the breeding season is likely to be low, despite the potential for connectivity.
494. The apportioning calculations estimate that approximately 43% of the puffins occurring on the Bellrock WFDA during the breeding season derive from this SPA colony, although only 55% of these birds are assumed to be breeding adults (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The breeding season for puffin is defined as April to mid-August, following the NatureScot (2020b) guidance.
495. After the breeding season puffins tend to migrate rapidly from their UK breeding areas, leaving the seas immediately adjacent to their colonies by late August and dispersing widely across northwest European seas and the Atlantic (Wernham et al. 2002, Harris and Wanless, 2011, Stone et al. 1995, Jessopp et al. 2013). There was no evidence of a peak in puffin abundance during the post-breeding dispersal period at the Bellrock WFDA and, in accordance with NatureScot advice (**Table 1.1**), no quantitative assessment of impacts during the non-breeding period is undertaken for the Farne Islands SPA puffin (although qualitative consideration of potential non-breeding season impacts is included within the conclusions for the Bellrock Wind Farm Infrastructure alone – see **Section 4.4.4.3.4**).

4.4.4.3.2 Project Alone: Construction and Decommissioning

4.4.4.3.2.1 Disturbance

496. Direct disturbance to puffin during the construction phase may arise within the Bellrock WFDA (and its immediate vicinity) as a result of increased vessel movements and helicopter activity, as well as from other activities directly associated with the installation of the wind turbines and other infrastructure. The levels of such activities that could arise are outlined in **Table 3.1**, with the potential numbers of vessel and helicopter transits also summarised in **Section 4.4.1.2.2.1**. These activities will occur during construction campaigns within a construction period (including site preparation) of at most eight years duration.
497. When using the marine environment (and not at the breeding colony), puffins are considered to have a relatively low sensitivity to such sources of direct disturbance. Thus, reviews of the sensitivity of different seabird species to disturbance from vessels and helicopter traffic assign puffin as '2' on a five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates

strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013).

498. The total area to be affected by such disturbance over the full (maximum) seven years of the construction phase also represents a small proportion of the total area of marine habitat available to puffin from the Farne Islands SPA. Thus, the Bellrock WFDA encompasses 280 km², representing approximately 0.3% of the total breeding season foraging area that is potentially available to the SPA puffin population, as defined by the generic measure of the species' mean maximum breeding season foraging range plus 1 SD (i.e. 137.1 ± 128.3 km - Woodward et al. 2019) and assuming that this range is represented by a semicircle to the seaward side of the colony. Similarly, the Bellrock WFDA represents just 0.9% of the breeding season foraging area if considering the mean maximum foraging range only.
499. In addition, it is important to consider that the construction activities will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, the activities will be concentrated within discrete (often small) parts of this wider area, and in any one location within the Bellrock WFDA they are unlikely to extend over the full duration of the construction phase, so further reducing the potential to which birds may be subject to disturbance effects.
500. The potential for disturbance effects during decommissioning is assumed to be similar to that for construction, noting that the duration of the decommissioning phase is not expected to exceed that of construction.
501. Given the low sensitivity of puffin to disturbance effects, the large distance of the Bellrock WFDA from the SPA (relative to the estimated puffin breeding season foraging range), the relatively small areas that will be subject to activities with the potential to result in disturbance at any given time during the construction period and the fact that these potential effects will be temporary, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Farne Islands SPA puffin population.

4.4.4.3.2.2 Displacement

502. As detailed above (**Section 4.4.4.3.2.1**), puffin is considered to have a low sensitivity to disturbance, whilst potential effects of disturbance during the construction and decommissioning phases will only extend across a small part of the wider foraging areas used by the Farne Island SPA puffin population and be limited to, at most, a seven year period during construction (and a likely similar or shorter period during decommissioning). Furthermore, as detailed above, potential effects of disturbance will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, at any given time the potential for disturbance effects that could lead to displacement of puffins from this SPA will be limited to relatively small areas, with the potential effects also being of a temporary nature.
503. Therefore, based upon the above, it is considered that there is relatively little potential for the Farne Island SPA puffin population to be affected by displacement during the construction or decommissioning phases, with any such effects only extending across relatively small areas and tending to be temporary in nature. Consequently, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Farne Island SPA puffin population.

4.4.4.3.2.3 Changes to Prey Availability

504. Sandeels, *Ammodytes* spp. are key prey for puffins, with a range of other species taken including clupeids, *Clupeidae* spp. and gadids, *Gadidae* spp. (del Hoyo et al. 1996). Indirect effects on puffins may arise as a result of changes in the availability, distribution, or abundance of these species during the construction and decommissioning phases of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Farne Islands SPA puffin population in the short-term.
505. During construction there are a number of ways in which effects on puffin prey species may occur, with the description and conclusions on the impacts of these being the same as outlined in **Section 4.4.1.2.2.3** for kittiwake prey species. However, the Bellrock WFDA represents less than 0.3% of the total breeding season foraging area that is potentially available to the SPA puffin population (as defined in **Section 4.4.4.3.2.1** above), whilst potential effects on prey availability during construction will be limited to a relatively small proportion of the Bellrock WFDA at any one time and in many instances such effects will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.2.3**).
506. As outlined in **Section 4.4.1.2.2.3**, during decommissioning, despite the likelihood of impact magnitudes being reduced in comparison to those in construction, on a precautionary basis **Chapter 8: Fish and Shellfish Ecology (Volume II)** concludes that the magnitude of impact is assessed to be the same as for the construction phase for physical disturbance and temporary habitat loss, increased SSCs and sediment re-deposition, and underwater noise and vibration.
507. Based upon the above, it is considered that there is little potential for the Farne Islands SPA puffin population to be affected by changes to prey availability during the construction and decommissioning phases. Consequently, it is considered that there is no potential for construction or decommissioning related changes in prey availability to lead to an adverse effect on the Farne Islands SPA puffin population.

4.4.4.3.3 Project Alone: Operation and Maintenance

4.4.4.3.3.1 Disturbance

508. Vessel use and helicopter traffic within the Bellrock WFDA during the O&M phase may lead to direct disturbance of puffins in a similar way as for the construction phase (see **Section 4.4.4.3.2.1**). The levels of such activities that could arise are outlined in **Table 3.1**.
509. Overall, the activity levels within the Bellrock WFDA are predicted to be considerably lower during O&M than during construction. The maximum number of return vessel trips is predicted to be 211 per year, which is below the levels predicted for the construction phase, whilst the range and extent of activities that would be undertaken within the WFDA is considerably more limited than during construction. Furthermore, the predicted level of vessel activity is within the context the Bellrock WFDA and its immediate vicinity being subject to frequent vessel movements under existing, baseline, conditions, with the available data suggesting highest levels during the summer period (Bellrock WFDA EIA Report Appendix 12.1: Navigational Risk Assessment (Volume IV)). In addition to vessel trips, a total of up to 986 helicopter round trips per year may occur during the O&M phase, which would exceed levels predicted for the construction phase.

510. Given the low sensitivity of puffin to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.4.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Farne Islands SPA puffin population.

4.4.4.3.3.2 Displacement and Barrier Effects

511. The SNCB matrix approach provides the basis for estimating displacement effects on seabird species during the O&M phase in this assessment, with this approach assumed to also incorporate the impact of barrier effects within the estimates that are derived (SNCBs 2022, **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). Thus, throughout this section, mortality from displacement is assumed to refer to that which results from both displacement and barrier effects.
512. Displacement mortality is calculated using the peak population size (using the counts of birds on the water plus those in flight) for each of the relevant seasonal periods, averaged over the two years of baseline DAS, for the Bellrock WFDA and two-kilometre buffer (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.49**). A displacement rate is applied to each of the seasonally specific mean peak population sizes to estimate the numbers of displaced birds in each seasonal period, with an assumed mortality rate applied to those birds estimated to be displaced (but, noting, that for puffin SPA populations quantitative consideration of effects is limited to the breeding season, in accordance with NatureScot advice (**Table 1.1**), **Section 4.4.1.2.1**). The displacement and mortality rates used in this assessment follow NatureScot guidance (NatureScot, 2023d), and for puffin are:
- Breeding period: 60% displacement with lower and upper mortality rates of 3% and 5%.
513. Estimates of puffin mortality were produced using the SNCB matrix and then apportioned to the Farne Islands SPA puffin population during the breeding period according to NatureScot's interim guidance (NatureScot, 2018). The resulting mortality estimates for the breeding season were apportioned to age classes on the basis of stable age distributions produced by population models. Finally, it was assumed that 7% of the breeding adults miss breeding in any given year (i.e. sabbatical birds), so that the estimated adult mortality during the breeding season was adjusted accordingly. This approach is described in full in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, and follows the advice provided to the Applicant by NatureScot (**Table 1.1**).

Table 4.49: Puffin Mean Peak Abundance Estimate for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Farne Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	360	0.549	0.433	0.433	0.07

514. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Farne Islands SPA puffin population as a result of displacement is estimated to be 1.44 to 2.39 breeding adult birds and 1.27 to 2.11 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.50**).

Table 4.50: Potential Annual Mortality of Farne Islands SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	1.441	1.272
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	1.441	1.272
Upper mortality estimate	Breeding	60%	5%	2.394	2.113
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	2.394	2.113

515. The additional annual mortality of adult puffins from the Farne Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0014% (lower estimate) to 0.0024% (upper estimate) of the current adult breeding population at this colony (i.e. 100,206 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.100 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.014% and 0.024%.

516. Based upon the above, the potential levels of impact on the Farne Islands SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.4.3.3.3 Changes to Prey Availability

517. Sandeels, *Ammodytes* spp. are key prey for puffins, with a range of other species taken including clupeids, *Clupeidae* spp. and gadids, *Gadidae* spp. (del Hoyo et al. 1996). Indirect effects on puffins may arise as a result of changes in the availability, distribution, or abundance of these species during the O&M phase of the Bellrock WFDA. Reduction or disruption to prey availability may cause

displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Farne Islands SPA puffin population in the short-term.

518. During O&M there are a number of ways in which effects on puffin prey species may occur, with the description and conclusions on the impacts of these being the same as outlined in **Section 4.4.1.2.2.3** for kittiwake prey species. However, the Bellrock WFDA represents less than 0.3% of the total breeding season foraging area that is potentially available to the SPA puffin population (as defined in **Section 4.4.4.3.2.1** above). In addition, potential effects on prey availability during O&M will be limited to a relatively small proportion of the Bellrock WFDA at any one time and some effects, such as disturbance and temporary habitat loss, and increased SSC will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.2.3**).
519. Based upon the above, it is considered that there is little potential for the Farne Islands SPA razorbill population to be affected by changes to prey availability during the O&M phase. Consequently, it is considered that there is no potential for O&M related changes in prey availability to lead to an adverse effect on the Fowlsheugh SPA razorbill population.

4.4.4.3.3.4 Secondary Entanglement

520. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including puffins from the Farne Islands SPA).
521. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Farne Islands SPA puffin population as a result of secondary entanglement.

4.4.4.3.4 Project Alone Conclusion

522. The potential effects, as considered in **Section 4.4.4.3.2.1** to **Section 4.4.4.3.3.4** above, from the Bellrock Wind Farm Infrastructure alone on the Farne Islands SPA puffin population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. As outlined in **Section 4.4.4.3.1**, the assessment for the SPA population focusses on breeding season effects, in accordance with NatureScot (**Table 1.1**). This is because puffins migrate rapidly from their UK breeding areas, dispersing widely across northwest European seas and the Atlantic, so that puffins occurring within the Bellrock WFDA and two-kilometre buffer during the non-breeding period are unlikely to derive from Farne Islands SPA population. This, together with the low numbers of puffins recorded during the non-breeding period in the baseline DAS (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**), means that effects on the SPA population from the Bellrock Wind Farm Infrastructure alone during the non-breeding period are highly unlikely to occur.
523. Based upon the above considerations, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on the Farne Islands SPA puffin population.

4.4.4.3.5 Effects In-combination

4.4.4.3.5.1 Effects of Relevance to the In-combination Assessment

524. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Farne Islands SPA puffin population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
525. Therefore, the potential for effects of the Bellrock WFDA to act on the Farne Islands SPA puffin population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) effect pathway during O&M.

4.4.4.3.5.2 Displacement/Barrier Effects

526. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Farne Islands SPA puffin population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
527. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates for the breeding season for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see Table 4.50), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
528. Full details of the displacement mortality estimates for the Farne Islands SPA puffin population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.51**).

Table 4.51: Potential Annual Mortality of Farne Islands SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	30.40	23.73
	Upper mortality estimate	47.86	39.54
Including Berwick Bank Wind Farm	Lower mortality estimate	43.24	41.07
	Upper mortality estimate	69.26	68.44
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%, respectively.			

529. The potential mortality on the Farne Islands SPA puffin population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 30 to 48 breeding adult birds and 24 to 40 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 43 to 69 adults and 41 to 68 subadults (**Table 4.51**).
530. In terms of the additional annual mortality of adult birds, these estimates represent 0.0303% (lower estimate) to 0.0478% (upper estimate) of the current adult breeding population at this colony (i.e. 100,206 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0432% (lower estimate) to 0.0691% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.1 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.303% to 0.478% (with the Berwick Bank Wind Farm effects excluded) and 0.432% to 0.691% (with the Berwick Bank Wind Farm effects included).
531. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA methodology and

descriptions of outputs are as detailed in **Section 4.4.1.2.5.2**. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.52: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Farne Islands SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	79,460	0.9946	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	78,563	0.9942	0.9997	0.9879	48.98
	Upper mortality estimate	78,154	0.9940	0.9995	0.9805	48.38
Including Berwick Bank	Lower mortality estimate	78,004	0.9940	0.9995	0.9814	48.28
	Upper mortality estimate	77,089	0.9937	0.9992	0.9701	47.50

532. No adverse effect on the Farne Islands SPA puffin population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 3% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.08% (**Table 4.52**). The metrics for the lower mortality estimate indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.05% in the annual population growth rate.

533. In addition to projecting the PVAs over a 35 year period, 50 year projections were also undertaken in which the wind farm effects were incorporated for the first 35 years followed by a 15 year recovery period without any wind farm effects. In terms of the CPS and CPGR metrics, these 50 year projections gave very similar outputs to the 35 year projections for the displacement effects on the SPA puffin population. Thus, there were very small decreases in the predicted level of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 3% and 2% for the upper and lower displacement mortality estimates, respectively (Table 3.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

534. Based upon the above, the potential levels of impact on the Farne Island SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.4.3.6 In-combination Conclusion

535. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Farne Islands SPA puffin population is predicted to cause the population to be up to 3% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Farne Islands SPA puffin population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Farne Islands SPA puffin population (Marine Directorate, 2025).
536. The small scale of the potential reduction in the size of the SPA population associated with the in-combination effects should also be considered within the context of a population for which the overall trend since the late 1980s has been increasing and which is currently substantially above the citation level (**Table 4.39, Plate 4.5**). Consequently, it is concluded that there is no potential for an adverse effect on the Farne Islands SPA puffin population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, this conclusion is reached within the context of a range of precautionary assumptions incorporated into the assessment of SPA puffin populations.

4.4.4.4 Assessment for the Breeding Seabird Assemblage

537. The breeding seabird assemblage for the Farne Islands SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 163,819 seabirds). Kittiwake and puffin comprise two of the 10 species identified in the citation and other Natural England advice (see **Section 4.4.4.1**) as having populations which are considered to be of European or national importance and which contribute to the Farne Islands SPA breeding seabird assemblage.
538. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. However, in relation to the SPA puffin population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake and puffin are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, the potential for an adverse effect is identified only in relation to kittiwake (and only as a result of the in-combination effects).

539. The Farne Islands SPA kittiwake population is currently estimated to number 2,895 AONs. It is considered that the scale of the potential in-combination impacts, in conjunction with the small size and long-term decline of this population, is sufficient to represent an increased risk of this population being lost from the breeding seabird assemblage.
540. Given the above, it is concluded that the potential for an adverse effect on the Farne Islands SPA seabird assemblage cannot be excluded in relation to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. No potential for an adverse effect on the SPA seabird assemblage is identified in relation to the Bellrock Wind Farm Infrastructure alone.

4.4.4.5 Site Conclusion

541. It is concluded that the possibility of an adverse effect cannot be excluded for the Farne Islands SPA breeding seabird assemblage and population of breeding kittiwake. For both the assemblage and the kittiwake population, the potential for an adverse effect arises from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone).
542. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Farne Islands SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.5 Forth Islands SPA

4.4.5.1 European Site Information and Conservation Objectives

543. The Forth Islands SPA comprises seabird colonies on multiple islands in the Firth of Forth, southeast Scotland. The SPA is approximately 158 km from the Bellrock WFDA. The Isle of May is the closest of the islands within the SPA to the Bellrock WFDA, with the other islands in the SPA being Inchmickery, Fidra, The Lamb, Craigleith, Bass Rock (all of which were classified in April 1990) and Long Craig (which was an extension to the site and was classified in February 2004). There is a seaward extension from each island of the SPA extending approximately 2 km into the marine environment.
544. The Forth Islands SPA qualifies under Article 4.1 by regularly supporting populations of European importance of four Annex I species (**Table 4.39**). The SPA also qualifies under Article 4.2 by regularly supporting populations of European importance of four migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including five species named only as component species (**Table 4.39**). The potential for LSE has been identified in relation to four of the 13 qualifying species or components of the seabird assemblage feature (**Table 4.39**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.

545. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
546. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
547. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.53: Details on the Qualifying Features of the Forth Islands SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable declining	90,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable, no change	8,400 pairs	Yes
Herring gull ¹	Breeding	Favourable maintained	6,600 pairs	No
Lesser black-backed gull	Breeding	Favourable maintained	1,500 pairs	No
Sandwich tern	Breeding	Unfavourable, no change	440 pairs	No
Roseate tern	Breeding	Unfavourable, no change	8 pairs	No
Common tern	Breeding	Unfavourable, no change	334 pairs	No
Arctic tern	Breeding	Favourable maintained	540 pairs	No
Guillemot ¹	Breeding	Favourable maintained	16,000 pairs	No
Razorbill ¹	Breeding	Favourable maintained	1,400 pairs	Yes
Puffin	Breeding	Favourable maintained	14,000 pairs	Yes

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Gannet	Breeding	Favourable maintained	21,600 pairs	Yes
Cormorant ¹	Breeding	Unfavourable, no change	200 pairs	No
Shag	Breeding	Unfavourable, no change	2,400 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.5.2 Assessment for the Kittiwake Population

548. The Forth Islands SPA kittiwake population is currently estimated to number 6,557 AONs (equating to 13,114 breeding individuals), based upon the most recently available count data from 2024 (JNCC and BTO, 2025). The SPA population has undergone a long-term and marked decline, from an estimate of more than 10,000 AONs in 1987 to just 2,450 AONs by 2013. Since 2013, there has been evidence of limited recovery, with the SPA population estimated at 4,542 AONs by the time of the 2015 - 2021 Seabirds Count census and the 2024 count indicating that this recovery continues (Burnell et al. 2023, JNCC and BTO, 2025). However, despite this recovery, the SPA population size remains below the citation level of 8,400 pairs (**Table 4.53**).

4.4.5.2.1 The Potential for Impacts on the Kittiwake Population

549. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.

550. At a distance of 158 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Forth Islands SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and two-kilometre buffer by the Forth Islands SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Forth Islands SPA at any given time (Cleasby et al. 2018). Additionally, tracking of 50 breeding kittiwakes from the Forth Islands SPA in each of 2021 and 2023 demonstrated no usage of the Bellrock WFDA, which was well beyond the 64 km (2021) and 55 km (2023) mean maximum foraging range of the tracked birds, whilst the overall findings from nine years of tracking data for the Forth Islands SPA kittiwakes (collected between 2010 and 2023 and based on an average of 28 tracked birds in each year) show that the Bellrock WFDA is well beyond the 50% and 95% UD in each year (Bogdanova et al. 2022, 2025).

551. The apportioning calculations estimate that approximately 3% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by the Forth Islands SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Forth Islands SPA is somewhat lower than the estimated 3%.
552. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Forth Islands SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
553. Given the above, the Bellrock WFDA may have potential effects on the Forth Islands SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.5.2.2 Project Alone: Construction and Decommissioning

4.4.5.2.2.1 Disturbance

554. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Forth Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Forth Islands SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
555. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Forth Islands SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.5.2.2.2 Displacement

556. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Forth Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Forth Islands SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
557. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Forth Islands SPA

kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.5.2.2.3 Changes to Prey Availability

558. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Forth Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Forth Islands is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Forth Islands SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
559. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Forth Islands SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Forth Islands SPA kittiwake population.

4.4.5.2.3 Project Alone: Operation and Maintenance

4.4.5.2.3.1 Disturbance

560. The assessment of the potential effects of disturbance during the O&M phase on the Forth Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Forth Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Forth Islands SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).
561. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Forth Islands SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Forth Islands SPA kittiwake population.

4.4.5.2.3.2 Displacement/Barrier Effects

562. The potential effects of displacement and barrier effects during the O&M phase on the Forth Islands SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.54**). The resultant seasonal mortality estimates were then apportioned to the Forth Islands SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the

breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.54**.

Table 4.54: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.034	0.034	0.1
Autumn passage	94	N/A	0.004	0.003	N/A
Spring passage	84	N/A	0.006	0.003	N/A

563. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Forth Islands SPA kittiwake population as a result of displacement is estimated to be 0.03 to 0.09 breeding adult birds and 0.00 to 0.01 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.55**). Over 85% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.55: Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.026	0.002
	Autumn passage	30%	1%	0.001	0.001
	Spring passage	30%	1%	0.002	0.001
	Annual total	-	-	0.029	0.003
Upper mortality estimate	Breeding	30%	3%	0.081	0.005
	Autumn passage	30%	3%	0.004	0.002
	Spring passage	30%	3%	0.005	0.002
	Annual total	-	-	0.089	0.010

564. The additional annual mortality of adult kittiwakes from the Forth Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0007% (upper estimate) of the current adult breeding population at this colony (i.e. 13,114 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report**

(**Volume IV**)), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.005%.

565. Based upon the above, the potential levels of impact on the Forth Islands SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.5.2.3.3 Collision Risk

566. The collision estimates for the Forth Islands SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Forth Islands SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
567. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.38 adult and 0.04 subadult birds (**Table 4.56**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0007% of the current adult breeding population at this colony (i.e. 13,114 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.020%.

Table 4.56: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Forth Islands SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.339	0.023
Autumn passage	0.019	0.011
Spring passage	0.017	0.008
Annual total	0.375	0.041

568. Based upon the above, the potential levels of impact on the Forth Islands SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.5.2.3.4 Combined Collisions and Displacement/Barrier Effects

569. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.40 and 0.46 adult and 0.04 and 0.05 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0031% to 0.0035% of the current adult breeding population at this colony (i.e. 13,114 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.021% and 0.024%.
570. Based upon the above, the potential levels of impact on the Forth Islands SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.5.2.3.5 Changes to Prey Availability

571. The assessment of the potential effects of changes to prey availability during the O&M phase on the Forth Islands SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Forth Islands SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA

during the breeding season by kittiwake from the Forth Islands SPA (Cleasby et al. 2018, Bogdanova et al. 2022, 2025).

572. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Forth Islands SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Forth Islands SPA kittiwake population.

4.4.5.2.4 Project Alone Conclusion

573. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Although the potential additional mortality is extremely small, representing less than one half of an adult bird, it is considered that within the context of the long term decline of this SPA population (and despite some indications of recent recovery), there is potential for this level of mortality to represent a meaningful addition to the in-combination effects from other plans and projects.

4.4.5.2.5 Effects In-combination

4.4.5.2.5.1 Effects of Relevance to the In-combination Assessment

574. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
575. Therefore, the potential for effects of the Bellrock WFDA to act on the Forth Islands SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.5.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

576. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Forth Islands SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
577. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.55**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential

displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).

578. Full details of the displacement mortality estimates for the Forth Islands SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.57**).

Table 4.57: Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	9.45	1.76
	Upper mortality estimate	26.36	5.29
Including Berwick Bank Wind Farm	Lower mortality estimate	13.00	2.06
	Upper mortality estimate	37.00	6.17
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

579. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from nine to 26 breeding adult birds and two to five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 13 to 37 adults and two to six subadults (**Table 4.57**).
580. In terms of the additional annual mortality of adult birds, these estimates represent 0.0721% (lower estimate) to 0.2010% (upper estimate) of the current adult breeding population at this colony (i.e. 13,114 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0991% (lower estimate) to 0.2821% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point

increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.494% to 1.377% (with the Berwick Bank Wind Farm effects excluded) and 0.679% to 1.932% (with the Berwick Bank Wind Farm effects included).

581. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.58: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	54,386	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	53,273	1.0332	0.9995	0.9808	48.10
	Upper mortality estimate	51,440	1.0323	0.9985	0.9477	44.48
Including Berwick Bank	Lower mortality estimate	52,956	1.0330	0.9993	0.9746	47.60
	Upper mortality estimate	50,475	1.0317	0.9980	0.9287	42.24

582. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.15% (**Table 4.58**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.05% in the annual population growth rate.

583. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Forth Islands SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% and 2% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
584. Based upon the above, the potential levels of impact on the Forth Islands SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.5.2.5.3 Collision Risk – Operation and Maintenance

585. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Forth Islands SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
586. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
587. Full details of the collision estimates for the Forth Islands SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.59**).

Table 4.59: Potential Annual Mortality of Forth Islands SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	25.16	7.03
Including Berwick Bank Wind Farm	48.88	8.53

588. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 25 to 49 breeding adult birds and seven to nine subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.59**).
589. In terms of the additional annual mortality of adult birds, these estimates represent 0.1919% (Berwick Bank excluded) to 0.3727% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 13,114 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.314% (Berwick Bank excluded) to 2.553% (Berwick Bank included).
590. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.60: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	54,386	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	51,434	1.0322	0.9985	0.9478	44.48
Including Berwick Bank	49,369	1.0310	0.9973	0.9072	40.36

591. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 5%

in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.15% (**Table 4.60**).

592. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.5.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
593. Based upon the above, the potential levels of impact on the Forth Islands SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.5.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

594. The potential mortality attributed to the Forth Islands SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.61**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.5.2.5.2** and **Section 4.4.5.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.61: Potential Annual Mortality of Forth Islands SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	34.62	8.79
	Upper mortality estimate	51.53	12.32
Including Berwick Bank Wind Farm	Lower mortality estimate	61.88	10.59
	Upper mortality estimate	85.88	14.71
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.57 and Table 4.59 due to rounding errors.			

595. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 35 to 52 breeding adult birds and nine to 12 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 62 to 86 adults and 11 to 15 subadults. These estimates represent 0.2640% (lower estimate) to 0.3929% (upper estimate) of the current adult breeding population at this colony (i.e. 13,114 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.4719% (lower estimate) to 0.6549% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.808% to 2.691% (with the Berwick Bank Wind Farm effects excluded) and 3.232% to 4.485% (with the Berwick Bank Wind Farm effects included).
596. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.61** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 10% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.3% (**Table 4.62**). The metrics for the lower mortality estimates indicate reductions of 7% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.2% in the annual population growth rate.

Table 4.62: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	54,386	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	50,538	1.0317	0.9980	0.9301	42.38
	Upper mortality estimate	48,875	1.0307	0.9970	0.8985	39.44
Including Berwick Bank	Lower mortality estimate	48,082	1.0302	0.9966	0.8840	37.68

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
	Upper mortality estimate	45,820	1.0288	0.9953	0.8426	33.26

597. As for the PVAs detailed in **Section 4.4.5.2.5.2** and **Section 4.4.5.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 10% and 7% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.5.2.6 *In-combination Conclusion*

598. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Forth Islands SPA kittiwake population is predicted to cause the population to be up to 10% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Forth Islands SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is also important to note that the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small, equating to less than one half of an adult bird for the upper mortality estimate.

599. The scale of the potential reduction in the size of the SPA population associated with the in-combination effects (relative to that predicted in the absence of any wind farm effects) is relatively small. Although the SPA population has undergone a marked, long term, decline (for which there are indications of recent recovery) and has an 'unfavourable, no change' condition status (**Table 4.53**), it is considered that the level of the potential impact resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is insufficient to affect the status of this population.

600. Consequently, it is concluded that there is no potential for an adverse effect on the Forth Islands SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As noted above, the contribution of the Bellrock WFDA to the predicted impacts on the SPA population is extremely small. As has been outlined in **Section 4.4.1.2.5.4**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.5.3 Assessment for the Razorbill Population

601. The Forth Islands SPA razorbill population occurs on several islands in the Firth of Forth. The largest colony occurs on the Isle of May, with smaller colonies on Craigleith, Bass Rock, Fidra and The Lamb. The Isle of May colony represents approximately 90% of the total SPA population. The Forth Islands SPA razorbill population is currently estimated to number 8,379 breeding adults, based upon the most recently available count data for the whole colony from the 2024 breeding season (JNCC and BTO, 2025). The razorbill population size in the SPA has increased since 1985, and despite a period of decline in the mid 2000's there has been a sustained increase since 2013, with the population size being considerably higher than the citation level of 1,400 pairs (Table 4.53).

4.4.5.3.1 The Potential for Impacts on the Razorbill Population

602. The Bellrock WFDA plus 2 km buffer does not overlap with the Forth Islands SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *'to maintain, in the long term, the population of the species as a viable component of the site'*.
603. At a distance of 158 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Forth Islands SPA is beyond the mean maximum plus one standard deviation of the breeding season foraging range (i.e. the metric used to determine breeding season connectivity) for razorbill when data from the Fair Isle colony are excluded (which is in accordance with NatureScot guidance for SPAs that are to the south of the Pentland Firth (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a)). Consequently, there is deemed to be no breeding season connectivity with the Bellrock WFDA and, hence, no potential for breeding season impacts on the Forth Islands SPA razorbill population.
604. In the non-breeding periods razorbills tend to move to central areas of the North Sea during the mid-winter period (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Forth Islands SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods, and potentially the winter period as well (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
605. Given the above, the Bellrock WIND Farm Infrastructure may have potential effects on Forth Islands SPA razorbill population during non-breeding periods only.

4.4.5.3.2 Project Alone: Construction and Decommissioning

4.4.5.3.2.1 Disturbance

606. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.1**) except that, importantly, the Forth Islands SPA is beyond the distance for breeding season connectivity of razorbills and,

consequently, only non-breeding period impacts are assessed. As outlined in **Section 4.4.2.3.2.1**, the potential for effects of construction-related disturbance on SPA razorbill populations is generally lower during the non-breeding periods than during the breeding season.

607. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the Forth Islands SPA razorbill population (and noting that there is no breeding season connectivity for the Forth Islands SPA razorbill population), it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.5.3.2.2 Displacement

608. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.2**) but noting, as in **Section 4.4.5.3.2.1** above, that the Forth Islands SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
609. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the Forth Islands SPA razorbill population (and noting that there is no breeding season connectivity for the Forth Islands SPA razorbill population), it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.5.3.2.3 Changes to Prey Availability

610. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Forth Islands SPA razorbill population is essentially as for the Fowlsheugh razorbill population (**Section 4.4.2.3.2.3**) but noting, as in **Section 4.4.5.3.2.1** above, that the Forth Islands SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
611. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the Forth Islands SPA razorbill population (and noting that there is no breeding season connectivity for the Forth Islands SPA razorbill population), it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Forth Islands SPA razorbill population.

4.4.5.3.3 *Project Alone: Operation and Maintenance*

4.4.5.3.3.1 Disturbance

612. The assessment of the potential effects of disturbance during the O&M phase on the Forth Islands SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, but noting,

as in **Section 4.4.5.3.2.1** above, that the Forth Islands SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).

613. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' range in the non-breeding periods that will be subject intermittently to potentially disturbing activities (Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Forth Islands SPA razorbill population.

4.4.5.3.3.2 Displacement/Barrier Effects

614. The potential effects of displacement and barrier effects during the O&M phase on the Forth Islands SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.2.3.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.63**). The resultant mortality estimates for the non-breeding periods were then apportioned to the Forth Islands SPA and to the adult and subadult age classes using the BDMPS approach, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Report (Volume IV)** and summarised in **Table 4.63** (Furness, 2015).

Table 4.63: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	N/A	N/A	0.07
Autumn passage	0	N/A	0.009	0.006	N/A
Winter	6	N/A	0.007	0.002	N/A
Spring passage	82	N/A	0.009	0.006	N/A

615. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Forth Islands SPA razorbill population as a result of displacement is estimated to be 0.01 to 0.02 breeding adult birds and 0.00 to 0.01 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.64**). As detailed above (**Section 4.4.5.3.1**), all of the potential mortality from displacement is predicted to occur during the non-breeding periods because of the lack of connectivity during the breeding season.

Table 4.64: Potential Annual Mortality of Forth Islands SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.005	0.004
	Annual total	-	-	0.005	0.004
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.001	0.000
	Spring passage	60%	3%	0.016	0.011
	Annual total	-	-	0.017	0.011

616. The additional annual mortality of adult razorbills from the Forth Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0002% (upper estimate) of the current adult breeding population at this colony (i.e. 8,379 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.002%.

617. Based upon the above, the potential levels of impact on the Forth Islands SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.5.3.3.3 Secondary Entanglement

618. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear being caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring

practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Forth Islands SPA).

619. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Forth Islands SPA razorbill population as a result of secondary entanglement.

4.4.5.3.3.4 Changes to Prey Availability

620. The assessment of the potential effects of changes to prey availability during the O&M on the Forth Islands SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population but noting, as in **Section 4.4.5.3.2.1** above, that the Forth Islands SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
621. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the Forth Islands SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Forth Islands SPA razorbill population.

4.4.5.3.4 Project Alone Conclusion

622. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one fiftieth of an adult bird and only 0.0002% of the SPA population (with this population showing an overall long term increase), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Forth Islands razorbill population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.5.3.5 Effects In-combination

4.4.5.3.5.1 Effects of Relevance to the In-combination Assessment

623. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
624. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition

to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the Forth Islands SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.5.3.5.2 Displacement/Barrier Effects

625. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Forth Islands SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
626. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.64**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
627. Full details of the displacement mortality estimates for the Forth Islands SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.65**).

Table 4.65: Potential Annual Mortality of Forth Islands SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	41.45	34.75
	Upper mortality estimate	79.96	64.26
Including Berwick Bank Wind Farm	Lower mortality estimate	52.08	44.25
	Upper mortality estimate	98.91	80.90

Notes:

¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.

628. The potential mortality on the Forth Islands SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 41 to 80 adult birds and 35 to 64 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 52 to 99 adults and 44 to 81 subadults (**Table 4.65**).
629. In terms of the additional annual mortality of adult birds, these estimates represent 0.4947% (lower estimate) to 0.9543% (upper estimate) of the current adult breeding population at this colony (i.e. 8,379 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.6216% (lower estimate) to 1.1805% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 4.712% to 9.088% (with the Berwick Bank Wind Farm effects excluded) and 5.920% to 11.243% (with the Berwick Bank Wind Farm effects included).
630. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.66: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	23,875	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	19,849	1.0200	0.9950	0.8310	29.10
	Upper mortality estimate	16,777	1.0150	0.9900	0.7030	15.80

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Including Berwick Bank	Lower mortality estimate	18,899	1.0180	0.9940	0.7920	24.60
	Upper mortality estimate	15,379	1.0130	0.9880	0.6450	10.60

631. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). Based on the predicted impacts for this in-combination scenario, the CPS value for the upper mortality estimate indicates a reduction of 30% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 1% (**Table 4.66**). The metrics for the lower mortality estimates indicate reductions of 17% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.5% in the annual population growth rate.
632. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Forth Islands SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 30% and 17% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.5.3.6 *In-combination Conclusion*

633. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Forth Islands SPA razorbill population is predicted to cause the population to be up to 30% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Forth Islands SPA razorbill) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the

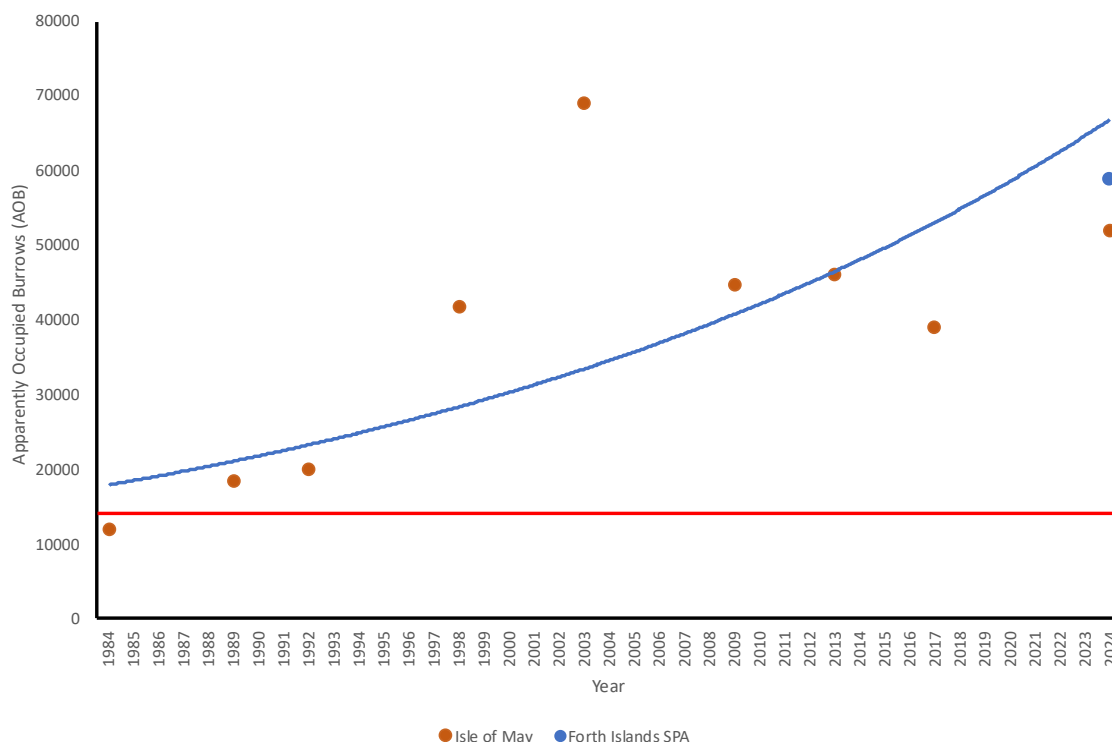
conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.5.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one fiftieth of an adult bird, representing only 0.0002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

634. Although the Forth Islands SPA razorbill population has been increasing for some years and is currently well above the citation level, with a 'favourable maintained' condition status (**Table 4.53**), it is considered that the scale of the potential reduction in population size (relative to that predicted in the absence of any wind farm effects) is sufficient to mean that the potential for an adverse effect due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded.
635. Consequently, it is concluded that there is the potential for an adverse effect on the Forth Islands SPA razorbill population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA razorbill populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.5.4 Assessment for the Puffin Population

636. The Forth Islands SPA puffin population occurs on several islands in the Firth of Forth. The largest colony is on the Isle of May, with smaller colonies on Craigleith, Fidra, Inchmickery, and The Lamb. The entire SPA puffin population is only counted sporadically and there are very few counts across all the colonies in the SPA in any one year. Therefore, count data are shown below for the Isle of May, where the population is counted approximately every five years (**Plate 4.6**). Numbers on the Isle of May have shown an overall increase since 1984 but with evidence of a decline in more recent years from a peak in abundance in the early 2000s. The numbers breeding on the Isle of May remain well above the SPA citation population size of 14,000 breeding pairs (**Table 4.53**). Based upon the most recently available count data from 2024 for the whole SPA, the Forth Islands SPA puffin population is currently estimated to number 58,980 AOBs, which is taken to equate to 117,960 breeding individuals. This represents a 37% increase compared to the estimate from the Seabirds Count census for the period 2015 – 2021 period (Burnell et al. 2023). The Forth Islands SPA puffin population is considered to be in 'favourable maintained' condition.

Plate 4.6: Puffin Population Trend on the Isle of May (Which Holds Almost 90% of the Forth Islands SPA Population) between 1984 and 2024. The Red Line Shows the Citation Population Size for the Forth Islands SPA (14,000 Breeding Pairs). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)



4.4.5.4.1 The Potential for Impacts on the Puffin Population

637. For the same reasons as outlined for the Farne Islands SPA puffin population (**Section 4.4.4.3.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
638. At a distance of 158 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Forth Islands SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for puffin, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of puffin (62.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and two-kilometre buffer by Forth Islands SPA puffins during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies undertaken on the Isle of May, which relate to the chick-rearing period. Thus, tracking data from six different years (involving data from a total of 116 breeding adult puffin) show no overlap of the 50% and 95% UD with the Bellrock WFDA in any year, with these UD never extending beyond the eastern boundary of the Berwick Bank Wind Farm. The mean maximum ranges recorded in 2021 (from 24 birds) and 2023 (from 26 birds) were only 40.5 km (± 1.8 ; standard error (SE)) and 39.6 km (± 1.9 ; SE), respectively (Bogdanova et al. 2022, 2025).

639. The apportioning calculations estimate that approximately 36% of the puffins occurring on the Bellrock WFDA during the breeding season derive from this SPA colony, although only 45% of these birds are assumed to be breeding adults (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The breeding season for puffin is defined as April to mid-August, following the NatureScot (2020b) guidance.
640. For the same reasons as detailed for the Farne Islands SPA puffin population (see **Section 4.4.4.3.1**), quantitative assessment of the Forth Islands SPA puffin population is limited to the breeding season (with qualitative consideration of potential non-breeding period impacts included within the conclusions for the Bellrock Wind Farm Infrastructure alone – see **Section 4.4.5.4.4**). This is in accordance with NatureScot advice (**Table 1.1**).

4.4.5.4.2 Project Alone: Construction and Decommissioning

4.4.5.4.2.1 Disturbance

641. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the two SPAs are a similar distance from the Bellrock WFDA. As detailed above (**Section 4.4.5.4.2**), extensive tracking data provide no evidence that puffins from the Forth Islands SPA use the Bellrock WFDA and 2 km buffer during the breeding season (Bogdanova et al. 2022, 2025).
642. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.1**. On the basis of these details as applied to the Forth Islands SPA puffin population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.2.2 Displacement

643. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the two SPAs are a similar distance from the Bellrock WFDA. As detailed above (**Section 4.4.5.4.2**), extensive tracking data provide no evidence that puffins from the Forth Islands SPA use the Bellrock WFDA and 2 km buffer during the breeding season (Bogdanova et al. 2022, 2025).
644. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.2**. On the basis of these details as applied to the Forth Islands SPA puffin population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.2.3 Changes in Prey Availability

645. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Forth Islands SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the two SPAs are a similar distance from the Bellrock WFDA. As detailed above (**Section 4.4.5.4.2**), extensive tracking data provide no evidence that

puffins from the Forth Islands SPA use the Bellrock WFDA and 2 km buffer during the breeding season (Bogdanova et al. 2022, 2025).

646. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.3**. On the basis of these details as applied to the Forth Islands SPA puffin population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.3 *Project Alone: Operation and Maintenance*

4.4.5.4.3.1 Disturbance

647. The assessment of the potential effects of disturbance during the O&M phase on the Forth Islands SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the two SPAs are a similar distance from the Bellrock WFDA. As detailed above in **Section 4.4.5.4.2**, extensive tracking data provide no evidence that puffins from the Forth Islands SPA use the Bellrock WFDA and 2 km buffer during the breeding season (Bogdanova et al. 2022, 2025).
648. The details of the assessment of the potential effects of disturbance during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.3.1**. On the basis of these details as applied to the Forth Islands SPA puffin population, it is considered that there is no potential for O&M related disturbance to lead to an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.3.2 Displacement and Barrier Effects

649. The potential effects of displacement and barrier effects during the O&M phase on the Forth Island SPA puffin population were assessed using the approach and methods outlined for the Farne Island SPA puffin population in **Section 4.4.4.3.3.2**. Thus, the displacement and mortality rates advised for puffin by NatureScot (2023d) were applied to the mean peak population size of puffin within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.67**). For puffin SPA populations, quantitative consideration of effects is limited to the breeding season (in accordance with NatureScot advice (**Table 1.1**) and **Section 4.4.4.3.1**). Therefore, the resultant breeding season mortality estimate was apportioned to the Forth Islands SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Report (Volume IV)** and summarised in **Table 4.67**.

Table 4.67: Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	360	0.454	0.357	0.357	0.07

650. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Forth Islands SPA puffin population as a result of displacement is estimated to be 0.98 to 1.63 breeding adult birds and 1.27 to 2.10 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.68**).

Table 4.68: Potential Annual Mortality of Forth Islands SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.980	1.267
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	0.980	1.267
Upper mortality estimate	Breeding	60%	5%	1.628	2.105
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	1.628	2.105

651. The additional annual mortality of adult puffins from the Forth Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0008% (lower estimate) to 0.0014% (upper estimate) of the current adult breeding population at this colony (i.e. 117,960 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.100 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.008% and 0.014%.

652. Based upon the above, the potential levels of impact on the Forth Islands SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.5.4.3.3 Changes to Prey Availability

653. The assessment of the potential effects of changes to prey availability during O&M phase on the Forth Islands SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the two SPAs are a similar distance from the Bellrock WFDA. As detailed above (**Section 4.4.5.4.2**), extensive tracking data provide no evidence that puffins from the Forth Islands

SPA use the Bellrock WFDA and 2 km buffer during the breeding season (Bogdanova et al. 2022, 2025).

654. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.3**. On the basis of these details as applied to the Forth Islands SPA puffin population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.3.4 Secondary Entanglement

655. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including puffins from the Forth Islands SPA).
656. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Forth Islands SPA puffin population as a result of secondary entanglement.

4.4.5.4.4 Project Alone Conclusion

657. The potential effects, as considered in **Section 4.4.5.4.2.1** to **Section 4.4.5.4.3.4** above, from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA puffin population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. As outlined in **Section 4.4.5.1**, the assessment for the SPA population focusses on breeding season effects, in accordance with NatureScot advice (**Table 1.1**).
658. This is because puffins migrate rapidly from their UK breeding areas, dispersing widely across northwest European seas and the Atlantic, so that puffins occurring within the Bellrock WFDA and 2 km buffer during the non-breeding period are unlikely to derive from Forth Islands SPA population. This, together with the low numbers of puffins recorded during the non-breeding period in the baseline DAS (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**), means that effects on the SPA population from the Bellrock Wind Farm Infrastructure alone during the non-breeding period are highly unlikely to occur.
659. Based upon the above considerations, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on the Forth Islands SPA puffin population.

4.4.5.4.5 Effects In-combination

4.4.5.4.5.1 Effects of Relevance to the In-combination Assessment

660. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA puffin population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
661. Therefore, the potential for effects of the Bellrock WFDA to act on the Forth Islands SPA puffin population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) effect pathway during O&M.

4.4.5.4.5.2 Displacement/Barrier Effects

662. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Forth Islands SPA puffin population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
663. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.68**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt wind farm was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the Forth Islands SPA puffin population ((**Table 1.1**), Marine Directorate, 2024).
664. Full details of the displacement mortality estimates for the Forth Islands SPA puffin population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.69**).

Table 4.69: Potential Annual Mortality of Forth Islands SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	162.54	170.48
	Upper mortality estimate	264.10	284.12
Including Berwick Bank Wind Farm	Lower mortality estimate	180.66	191.84
	Upper mortality estimate	294.30	319.72
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%, respectively.			

665. The potential mortality on the Forth Islands SPA puffin population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 163 to 264 breeding adult birds and 170 to 284 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 181 to 294 adults and 192 to 320 subadults (**Table 4.69**).
666. In terms of the additional annual mortality of adult birds, these estimates represent 0.1378% (lower estimate) to 0.2239% (upper estimate) of the current adult breeding population at this colony (i.e. 117,960 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1532% (lower estimate) to 0.2495% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.1 – see **Table 2.11 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.378% to 2.239% (with the Berwick Bank Wind Farm effects excluded) and 1.532% to 2.495% (with the Berwick Bank Wind Farm effects included).
667. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA methodology and

descriptions of outputs are as detailed in **Section 4.4.1.2.5.2**. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.70: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	382,494	1.0282	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	362,689	1.0267	0.9985	0.9478	44.74
	Upper mortality estimate	350,423	1.0257	0.9976	0.9156	41.24
Including Berwick Bank	Lower mortality estimate	360,427	1.0265	0.9983	0.9418	44.16
	Upper mortality estimate	346,861	1.0254	0.9973	0.9060	40.32

668. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA puffin population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 8% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.24% (**Table 4.70**). The metrics for the lower mortality estimates indicate reductions of 5% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.15% in the annual population growth rate.

669. In addition to projecting the PVAs over a 35 year period, 50 year projections were also undertaken in which the wind farm effects were incorporated for the first 35 years followed by a 15 year recovery period without any wind farm effects. In terms of the CPS and CPGR metrics, these 50 year projections gave very similar outputs to the 35 year projections for the displacement effects on the SPA puffin population. Thus, there were very small decreases in the predicted level of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 8% and 5% for the upper and lower displacement mortality estimates respectively (Table 3.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

670. Based upon the above, the potential levels of impact on the Forth Islands SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.5.4.6 In-combination Conclusion

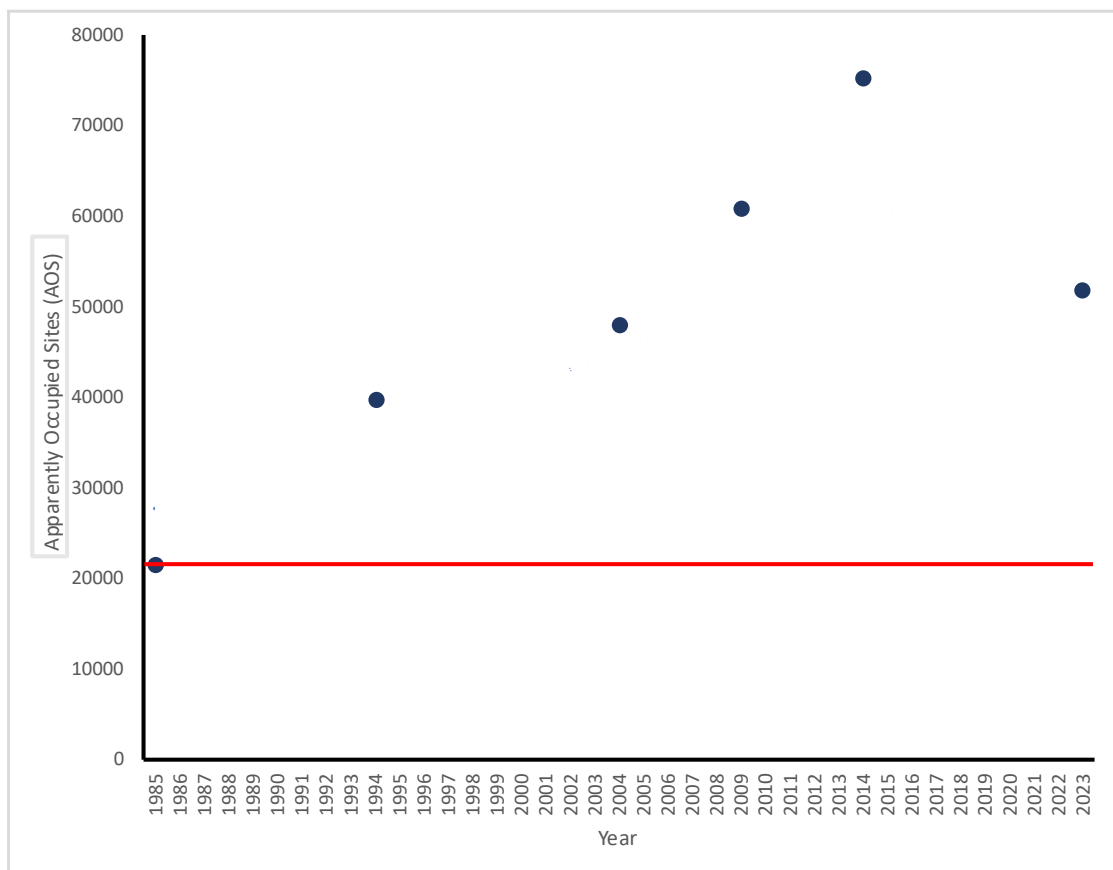
671. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Forth Islands SPA puffin population is predicted to cause the population to be up to 8% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Forth Islands SPA puffins) for which the potential for an adverse effect was concluded (Marine Directorate, 2025).
672. The small scale of the potential reduction in the size of the SPA population associated with the in-combination effects should also be considered within the context of a population for which the overall trend since the mid-1980s has been increasing and which is currently substantially above the citation level, with a 'favourable maintained' condition status (**Table 4.53, Plate 4.6**). Consequently, it is concluded that there is no potential for an adverse effect on the Forth Islands SPA puffin population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, this conclusion is reached within the context of a range of precautionary assumptions incorporated into the assessment of SPA puffin populations.

4.4.5.5 Assessment for the Gannet Population

673. Gannets only occur in the North Atlantic, nesting at relatively high latitudes and wintering south of their breeding sites. Most gannets nest in the eastern Atlantic, with the majority (60 – 70%) of birds breeding in colonies around Great Britain. Other gannet colonies occur in France, Ireland, Norway, Faroe Islands and Iceland. Gannets forage entirely at sea on fish, including discards from fishing boats, and have large foraging ranges when breeding (Woodward et al. 2019). Gannets from the Forth Islands SPA nest on the Bass Rock and forage across a large portion of the North Sea (Lane et al. 2020), though their foraging ranges show limited overlap with those of gannets from other colonies (Wakefield et al. 2013).
674. The numbers of gannet breeding on the Bass Rock had undergone a long term increase, making the Bass Rock the world's largest gannet colony by 2014, at which time there were an estimated 75,259 AOS (equating to 150,518 individuals) (Murray et al. 2014). Subsequently, there has been an abrupt and marked decline following the advent of HPAI at the colony in 2022, with the population estimated as 51,844 AOS (equating to 103,688 individuals) in 2023 (Harris et al. 2023, **Plate 4.7**). More widely, gannet populations have increased substantially through the 20th and 21st centuries, with expansion at existing colonies and the development of new colonies occurring during this period (Mitchell et al. 2004, Murray et al. 2015, Burnell et al. 2023). Many of these colonies have been affected by the recent HPAI outbreak, with the longer term impacts of this on the previous widespread, and sustained, population increase currently unclear (Lane et al. 2023).

675. Prior to the outbreak of HPAI, the Bass Rock colony was considered to be close to carrying capacity, with substantive increases having occurred over the last few decades and further increase likely limited by the availability of suitable nesting areas on the island (Murray et al. 2015, Harris et al. 2023). Despite the recent decline due to HPAI, the Forth Island SPA population continues to remain well above the citation level (**Table 4.53, Plate 4.7**)

Plate 4.7: Gannet Population Trend at the Forth Islands SPA for the Period 1985 - 2023. The Red Line Shows the Citation Population Size for the SPA (21,600 pairs). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025) and Harris et al. (2023)



4.4.5.5.1 The Potential for Impacts on the Gannet Population

676. The Bellrock WFDA plus 2 km buffer does not overlap with the Forth Islands SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site* because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this first Conservation Objective (as for *the maintain in the long term no significant disturbance of the species*, because disturbance would only be considered significant if it caused an adverse effect on the population viability of the qualifying features).
677. From published information on gannet foraging ranges generally (Woodward et al. 2019) and tracking from the SPA specifically (Wakefield et al. 2013, Lane et al. 2020), it is apparent that during

the breeding period gannets from the Forth Islands SPA occur within the area of the Bellrock WFDA and adjacent two km buffer. This is reflected in the findings of the apportioning exercise, which estimates that 72% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.

678. Gannets from the Forth Islands SPA move south in autumn to winter at sea from the Bay of Biscay to the seas off west Africa, returning north in the spring, with the passage movements during both periods involving routes which mean that there is potential for birds from the SPA population to pass through the Bellrock WFDA and 2 km buffer (Fort et al. 2012, Furness, 2015). Thus, the non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
679. Given the above, the Bellrock Wind Farm Infrastructure may have potential effects on the Forth Islands SPA gannet population during breeding and non-breeding periods.

4.4.5.5.2 Project Alone: Construction and Decommissioning

4.4.5.5.2.1 Disturbance

680. Direct disturbance to gannets during the construction phase may arise within the Bellrock WFDA (and its immediate vicinity) as a result of increased vessel movements and helicopter activity, as well as from other activities directly associated with the installation of the wind turbines and other infrastructure. The levels of such activities that could arise are outlined in **Table 3.1**, with these activities occurring during construction campaigns within a construction period (including site preparation) of at most eight years duration.
681. A total of up to 1,615 vessel round trips may occur over the construction phase, whilst it is estimated that a maximum of 34 vessels could occur within the area of the Bellrock WFDA at any one time (**Table 3.1**). This is within the context of the Bellrock WFDA and its immediate vicinity being subject to frequent vessel movements under existing, baseline, conditions, with the available data suggesting highest levels during the summer period (Bellrock WFDA EIA Report Appendix 12.1: Navigational Risk Assessment (Volume IV)). In addition, a total of up to 816 helicopter round trips may occur during the construction phase.
682. When using the marine environment (and not at the breeding colony), gannets are considered to have a relatively low sensitivity to such sources of direct disturbance. Thus, reviews of the sensitivity of different seabird species to disturbance from vessels and helicopter traffic assign gannet as '2' on a five-scale ranking system, where 1 indicates hardly any or limited escape/avoidance behaviour and very short flight distance when approached and 5 indicates strong escape/avoidance behaviour and a large response distance (Garthe and Hüppop, 2004, Furness et al. 2013).
683. The total area to be affected by such disturbance over the full (maximum) seven years of the construction phase also represents a small proportion of the total area of marine habitat available

to gannets from the Forth Islands SPA. Thus, the Bellrock WFDA encompasses 280 km², representing less than 0.1% of the total breeding season foraging area that is potentially available to the SPA gannet population, as defined by the generic measure of the species' mean maximum breeding season foraging range plus 1 SD (i.e. 315.2±194.2 km - Woodward et al. 2019) and assuming that this range is represented by a semicircle to the seaward side of the colony. Similarly, the Bellrock WFDA represents just 0.2% of the breeding season foraging area if considering the mean maximum foraging range only.

684. During the autumn and spring passage periods, the potential for effects of construction-related disturbance is lower than during the breeding season because the SPA gannets are essentially transiting through the waters within which the Bellrock WFDA is located.
685. In addition, it is important to consider that the construction activities will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, the activities will be concentrated within discrete (often small) parts of this wider area, and in any one location within the Bellrock WFDA they are unlikely to extend over the full duration of the construction phase, so further reducing the potential to which birds may be subject to disturbance effects.
686. The potential for disturbance effects during decommissioning is assumed to be similar to that for construction, noting that the duration of the decommissioning phase is not expected to exceed that of construction.
687. Given the low sensitivity of gannet to disturbance effects, the relatively small areas that will be subject to activities with the potential to result in disturbance at any given time during the construction period and the fact that these potential effects will be temporary, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Forth Islands SPA gannet population.

4.4.5.5.2.2 Displacement

688. As detailed above (**Section 4.4.5.5.2.1**), gannet is considered to have a low sensitivity to disturbance, whilst potential effects of disturbance during the construction and decommissioning phases will only extend across a small part of the wider foraging areas used by the Forth Islands SPA gannet population and be limited to, at most, a seven year period during construction (and a likely similar or shorter period during decommissioning). Furthermore, as detailed above, potential effects of disturbance will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, at any given time the potential for disturbance effects that could lead to displacement of gannets from this SPA will be limited to relatively small areas, with the potential effects also being of a temporary nature.
689. Therefore, based upon the above, it is considered that there is relatively little potential for the Forth Islands SPA gannet population to be affected by displacement during the construction or decommissioning phases, with any such effects only extending across relatively small areas and tending to be temporary in nature. Consequently, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Forth Islands SPA gannet population.

4.4.5.5.2.3 Changes to Prey Availability

690. Gannets predominantly prey upon fish including herring, *Clupea harengus*; mackerel, *Scomber scombrus*; sprat, *Sprattus sprattus*; and sandeel, *Ammodytes* spp. as well as fishery discards (del Hoyo et al. 1996). Indirect effects on gannets may arise as a result of changes in the availability, distribution, or abundance of these species during the construction and decommissioning phases of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Forth Islands SPA gannet population in the short-term.
691. During construction there are a number of ways in which effects on gannet prey species may occur, with these being the same as outlined in **Section 4.4.1.2.2.3** for kittiwake prey species. As described for sandeel, *Ammodytes* spp. in **Section 4.4.1.2.2.3**, herring, *Clupea harengus* spawning grounds also have a high sensitivity to disturbance and habitat loss. On this basis, temporary habitat loss/disturbance to key prey species during the construction phase was assessed as having a minor adverse effect for sandeel, *Ammodytes* spp. and herring, *Clupea harengus* and negligible adverse for sprat, *Sprattus sprattus* and mackerel, *Scomber scombrus* in **Chapter 8: Fish and Shellfish Ecology (Volume II)**. The effects of increased SSC are as described in **Section 4.4.1.2.2.3** for kittiwake prey species, with **Chapter 8: Fish and Shellfish Ecology (Volume II)** concluding negligible adverse effects for all gannet key prey species. The effects of underwater noise are as described in **Section 4.4.1.2.2.3** for kittiwake prey species, with **Chapter 8: Fish and Shellfish Ecology (Volume II)** concluding minor adverse effects for all gannet key prey species.
692. The Bellrock WFDA represents less than 0.1% of the total breeding season foraging area that is potentially available to the SPA gannet population (as defined in **Section 4.4.5.5.2.1** above), whilst potential effects on prey availability during construction will be limited to a relatively small proportion of the Bellrock WFDA at any one time and in many instances such effects will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.2.3**). The potential for effects during the autumn and spring passage periods is considered to be lower than during the breeding season given that birds disperse widely through UK waters on migration to their wintering grounds (Kubetzki et al. 2009, Furness, 2015).
693. As outlined in **Section 4.4.1.2.2.3**, during decommissioning, despite the likelihood of impact magnitudes being reduced in comparison to those in construction, on a precautionary basis the **Chapter 8: Fish and Shellfish Ecology (Volume II)** concludes that the magnitude of impact is assessed to be the same as for the construction phase for physical disturbance and temporary habitat loss, increased SSCs and sediment re-deposition, and underwater noise and vibration.
694. Given their wide-ranging foraging behaviour and degree of plasticity in diet (del Hoyo et al. 1996), together with any effects being intermittent, spatially-restricted and temporary in nature, it is considered that there is no potential for construction or decommissioning related changes in prey availability to lead to an adverse effect on the Forth Islands SPA gannet population.

4.4.5.5.3 *Project Alone: Operation and Maintenance*

4.4.5.5.3.1 Disturbance

695. Vessel use within the Bellrock WFDA during the O&M phase may lead to direct disturbance of gannets in a similar way as for the construction phase (see **Section 4.4.5.5.2.1**). The levels of such activities that could arise are outlined in **Table 3.1**.
696. Overall, the activity levels within the Bellrock WFDA are predicted to be considerably lower during O&M than during construction. The maximum number of return vessel trips is predicted to be 211 per year, which is below the levels predicted for the construction phase, whilst the range and extent of activities that would be undertaken within the WFDA is considerably more limited than during construction. Furthermore, the predicted level of vessel activity is within the context of the Bellrock WFDA and its immediate vicinity being subject to frequent vessel movements under existing, baseline, conditions, with the available data suggesting highest levels during the summer period (**Appendix 12.1: Navigational Risk Assessment (Volume IV)**). In addition to vessel trips, a total of up to 986 helicopter round trips per year may occur during the O&M phase, which would exceed levels predicted for the construction phase.
697. Given the low sensitivity of gannet to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.5.5.2.1**), the very small areas (relative to the foraging ranges of birds from this SPA population (Woodward et al. 2019, Lane et al. 2020)) that will be subject intermittently to potentially disturbing activities, and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Forth Islands SPA gannet population.

4.4.5.5.3.2 Displacement/Barrier Effects

698. As for kittiwake (see **Section 4.4.1.2.3.2**), the SNCB matrix approach provides the basis for estimating displacement effects on gannet during the O&M phase in this assessment, with this approach assumed to also incorporate the impact of barrier effects within the estimates that are derived (SNCBs 2022, **Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)**). Thus, throughout this section, mortality from displacement is assumed to refer to that which results from both displacement and barrier effects.
699. The approach used to derive the predicted displacement mortality for gannet is as described in **Section 4.4.1.2.3.2** for the Buchan Ness to Collieston Coast SPA kittiwake population, and as detailed in **Appendix 10.3: Displacement Assessment Technical Report (Volume IV)**. Thus, a displacement rate is applied to each of the seasonally specific mean peak population sizes (as derived for the Bellrock WFDA plus two-kilometre buffer) to estimate the numbers of displaced birds in each seasonal period, with an assumed mortality rate applied to those birds estimated to be displaced. The displacement and mortality rates used in this assessment follow NatureScot guidance (NatureScot, 2023d), and for gannet are:
- Breeding period: 70% displacement with lower and upper mortality rates of 1% and 3%; and
 - Non-breeding periods: 70% displacement with lower and upper mortality rates of 1% and 3%.

700. The resultant mortality estimates were then apportioned to the Forth Islands SPA gannet population during the breeding and non-breeding periods according to NatureScot's interim guidance and the BDMPS approach, respectively (NatureScot, 2018, Furness, 2015) (**Table 4.71**). Apportionment to age classes was undertaken on the basis of the plumage characteristics of gannets, as recorded during the breeding season in the baseline DAS, whilst for the non-breeding periods this was based on the ratio of adults to subadults as estimated for the relevant BDMPS population. Finally, it was assumed that 10% of the breeding adults miss breeding in any given year (i.e. sabbatical birds), so that the estimated adult mortality during the breeding season was adjusted accordingly. This approach is described in full in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, and follows the advice provided to the Applicant by NatureScot (**Table 1.1**).

Table 4.71: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Forth Islands SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.722	0.722	0.10
Autumn passage	224	N/A	0.243	0.178	N/A
Spring passage	159	N/A	0.313	0.145	N/A

701. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Forth Islands SPA gannet population as a result of displacement is estimated to be two to six breeding adult birds and 0.48 to 1.42 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.72**). Approximately 50% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.72: Potential Annual Mortality of Forth Islands SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	1.140	0.035
	Autumn passage	70%	1%	0.389	0.284
	Spring passage	70%	1%	0.344	0.159
	Annual total	-	-	1.873	0.478
Upper mortality estimate	Breeding	70%	3%	3.419	0.105
	Autumn passage	70%	3%	1.143	0.833

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
	Spring passage	70%	3%	1.032	0.478
	Annual total	-	-	5.594	1.416

702. The additional annual mortality of adult gannets from the Forth Islands SPA population predicted due to displacement from the Bellrock WFDA represents 0.0018% (lower estimate) to 0.0054% (upper estimate) of the current adult breeding population at this colony (i.e. 103,688 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.02% and 0.07%.
703. Based upon the above, the potential levels of impact on the Forth Islands SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.5.5.3.3 Collision Risk

704. As for kittiwake (see **Section 4.4.1.2.3.3**), predictions of the number of gannets at risk from collisions due to the Bellrock Wind Farm Infrastructure alone were calculated using the stochastic version of the SOSS offshore collision risk model, as run in the Caneco (2022) shiny app⁴. For the purposes of this assessment, outputs from option 2 of the model are used, in accordance with NatureScot guidance (NatureScot, 2025), whilst the avoidance rate and species-specific input parameters were as advised by NatureScot (**Table 1.1**).
705. For gannet, a macro-avoidance rate of 70% is also applied to the density of birds in flight within the Bellrock WFDA during the non-breeding periods, again in accordance with NatureScot guidance (NatureScot, 2025). Full details of the modelling approach are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)**. The assessment is based upon the collision risk estimates for the worst-case design (**Table 3.1**)⁴.
706. Gannet collision estimates were calculated for the same seasonal periods as for the predicted displacement effects and then apportioned to the Forth Islands SPA gannet population and to age classes exactly as for the displacement effects (see **Section 4.4.5.5.3.2**). The assumption that 10% of the breeding adults were sabbatical birds was also applied to the estimated adult mortality during the breeding season. This approach is described in full in **Appendix 10.5: Offshore**

Ornithology Apportioning Technical Report (Volume IV), and follows the advice provided to the Applicant by NatureScot (**Table 1.1**).

707. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 10.14 adult and 0.81 subadult birds (**Table 4.73**). Most of this mortality (i.e. 88%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0098% of the current adult breeding population at this colony (i.e. 103,688 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.12%.

Table 4.73: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Forth Islands SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	9.351	0.288
Autumn passage	0.598	0.436
Spring passage	0.188	0.087
Annual total	10.137	0.811

708. Based upon the above, the potential levels of impact on the Forth Islands SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.5.5.3.4 Combined Collisions and Displacement/Barrier Effects

709. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 12 and 16 adult and one and two subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0116% to 0.0152% of the current adult breeding population at this colony (i.e. 103,688 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further

investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.143% and 0.187%.

710. Based upon the above, the potential levels of impact on the Forth Islands SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.5.5.3.5 Changes to Prey Availability

711. Gannets predominantly prey upon fish including herring, *Clupea harengus*; mackerel, *Scomber scombrus* sprat; *Sprattus sprattus* and sandeel, *Ammodytes* spp. as well as fishery discards (del Hoyo et al. 1996). Indirect effects on gannets may arise as a result of changes in the availability, distribution, or abundance of these species during the O&M phase of the Bellrock WFDA. Reduction or disruption to prey availability may cause displacement from foraging grounds or reduced energy intake, affecting survival rates or productivity in the Forth Islands SPA gannet population in the short-term.
712. During O&M there are a number of ways in which effects on gannet prey species may occur, with these being largely the same as outlined in **Section 4.4.1.2.3.5** for kittiwake prey species. In summary for gannet key prey species, **Chapter 8: Fish and Shellfish Ecology (Volume II)** concluded negligible adverse effects for disturbance and temporary habitat loss (all prey species), SSC (all prey species), EMF (all prey species), and permanent/long term habitat loss (all prey except for herring, *Clupea harengus* spawning grounds). Minor adverse effects were concluded for underwater noise for all gannet key prey species, and permanent/long term habitat loss for herring, *Clupea harengus* spawning grounds only.
713. The Bellrock WFDA represents less than 0.1% of the total breeding season foraging area that is potentially available to the Forth Islands SPA gannet population (as defined in **Section 4.4.5.5.2.1** above). The potential for effects during the autumn and spring passage periods are considered to be lower than during the breeding season given that birds disperse widely through UK waters on migration to their wintering grounds (Kubetzki et al. 2009, Furness, 2015). Given the potential effects on prey availability during O&M will be limited to a relatively small proportion of the Bellrock WFDA at any one time and in many instances such effects will also be temporary and short term in nature (as detailed in **Section 4.4.1.2.3.5**), it is considered that there is no potential for O&M related changes in prey availability to lead to an adverse effect on the Forth Islands SPA gannet population.

4.4.5.5.4 Project Alone Conclusion

714. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.5.5.5 *Effects In-combination*

4.4.5.5.5.1 *Effects of Relevance to the In-combination Assessment*

715. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Forth Islands SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
716. Therefore, the potential for effects of the Bellrock WFDA to act on the Forth Islands SPA gannet population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.5.5.5.2 *Displacement/Barrier Effects – Operation and Maintenance*

717. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Forth Islands SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
718. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.72**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt Wind Farm was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA gannet population (**Table 1.1**, Marine Directorate 2024).
719. Full details of the displacement mortality estimates for the Forth Islands SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.74**).

Table 4.74: Potential Annual Mortality of Forth Islands SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	117.34	51.59
	Upper mortality estimate	352.01	154.76
Including Berwick Bank Wind Farm	Lower mortality estimate	150.04	54.58
	Upper mortality estimate	450.08	163.74
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

720. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 117 to 352 breeding adult birds and 52 to 155 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 150 to 450 adults and 55 to 164 subadults (**Table 4.74**).
721. In terms of the additional annual mortality of adult birds, these estimates represent 0.1132% (lower estimate) to 0.3395% (upper estimate) of the current adult breeding population at this colony (i.e. 103,688 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1447% (lower estimate) to 0.4341% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.397% to 4.191% (with the Berwick Bank Wind Farm effects excluded) and 1.786% to 5.359% (with the Berwick Bank Wind Farm effects included).
722. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was

undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.75: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	135,351	1.0062	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	130,214	1.0051	0.9989	0.9608	43.04
	Upper mortality estimate	120,102	1.0029	0.9967	0.8872	29.46
Including Berwick Bank	Lower mortality estimate	129,052	1.0049	0.9986	0.9525	41.56
	Upper mortality estimate	116,986	1.0021	0.9959	0.8632	25.50

723. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA gannet population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value for the upper mortality estimate for this in-combination scenario indicates a reduction of 11% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.33% (**Table 4.75**). The metrics for the lower mortality estimates indicate reductions of 4% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.11% in the annual population growth rate.

724. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Forth Islands SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 11% and 4% for the upper and lower mortality estimates, respectively (Table

3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

725. The potential levels of impact on the Forth Islands SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered sufficient to mean that the potential for an adverse effect on the SPA population cannot be excluded. For the same reasons as set in greater detail in the In-combination conclusion below (**Section 4.4.5.5.6**), this conclusion is reached by considering these impacts within the context of the recent population decline following the HPAI outbreak and the current uncertainty over the population response and the potential for further outbreaks.

4.4.5.5.5.3 Collision Risk – Operation and Maintenance

726. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Forth Islands SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
727. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. As stated in **Section 4.4.1.2.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm, whilst the collision estimate for the Green Volt Wind Farm was excluded from all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the Forth Islands SPA gannet population (**Table 1.1**, Marine Directorate 2024).
728. Full details of the collision estimates for the Forth Islands SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.76**).

Table 4.76: Potential Annual Mortality of Forth Islands SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	416.70	43.44
Including Berwick Bank Wind Farm	524.68	45.59

729. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is an order of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality ranges from 417 to 525 breeding adult birds and 43 to 46 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.76**).
730. In terms of the additional annual mortality of adult birds, these estimates represent 0.4019% (Berwick Bank excluded) to 0.5060% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 103,688 individuals) (**Table 2.6 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see **Table 2.12 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 4.961% (Berwick Bank excluded) to 6.247% (Berwick Bank included).
731. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.77: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50th Centile
Baseline (no impact)	135,351	1.0062	N/A	N/A	N/A
Excluding Berwick Bank	120,398	1.0030	0.9968	0.8903	29.80
Including Berwick Bank	117,176	1.0022	0.9960	0.8651	25.86

732. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Forth Islands SPA gannet population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value for the collision estimate for this in-combination scenario indicates a reduction of 11% in the size

of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.32% (**Table 4.77**).

733. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.5.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 11% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
734. The potential levels of impact on the Forth Islands SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered sufficient to mean that the potential for an adverse effect on the SPA population cannot be excluded. For the same reasons as set in greater detail in the In-combination conclusion below (**Section 4.4.5.5.6**), this conclusion is reached by considering these impacts within the context of the recent population decline following the HPAI outbreak and the current uncertainty over the population response and the potential for further outbreaks.

4.4.5.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

735. The potential mortality attributed to the Forth Islands SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.78**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.5.5.2** and **Section 4.4.5.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.78: Potential Annual Mortality of Forth Islands SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	534.05	95.03
	Upper mortality estimate	768.71	198.19
Including Berwick Bank Wind Farm	Lower mortality estimate	674.72	100.18
	Upper mortality estimate	974.76	209.33
Notes:			
¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of			

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			
² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.74 and Table 4.76 due to rounding errors.			

736. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 534 to 769 breeding adult birds and 95 to 198 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 675 to 975 adults and 100 to 209 subadults. These estimates represent 0.5151% (lower estimate) to 0.7414% (upper estimate) of the current adult breeding population at this colony (i.e. 103,688 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.6507% (lower estimate) to 0.9401% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 6.359% to 9.153% (with the Berwick Bank Wind Farm effects excluded) and 8.034% to 11.606% (with the Berwick Bank Wind Farm effects included).
737. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.78** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.5.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 21% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.65% (**Table 4.79**). The metrics for the lower mortality estimates indicate reductions of 14% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.43% in the annual population growth rate.

Table 4.79: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Forth Islands SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	135,351	1.0062	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	115,820	1.0019	0.9957	0.8552	24.10
	Upper mortality estimate	107,043	0.9997	0.9935	0.7896	13.84
Including Berwick Bank	Lower mortality estimate	111,486	1.0008	0.9946	0.8237	18.50
	Upper mortality estimate	101,073	0.9981	0.9919	0.7465	8.58

738. As for the PVAs detailed in **Section 4.4.5.5.5.2** and **Section 4.4.5.5.5.3** (see also **Section 4.4.1.2.5.2**) above, the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 21% and 14% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.5.5.6 In-combination Conclusion

739. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Forth Islands SPA gannet population is predicted to result in the population being up to 21% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 0.65%. These estimates are based on excluding the predicted mortality for the Berwick Bank Wind Farm from the in-combination totals because the consent for the Berwick Bank Wind Farm is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Forth Islands SPA gannets) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

740. As detailed above, the Forth Islands SPA gannet population had shown a marked, and consistent, long-term increase in size until the advent of HPAI at the colony in 2022 (**Plate 4.7**). This long-term increase reflects the wider trend in gannet populations across Scotland and the rest of the UK (prior to HPAI), with earlier count data indicating that the period of rapid increase in the Forth Islands SPA population extends back to the 1950s or 1960s (Mitchell et al. 2004, Murray et al. 2015, Natural England, 2020). Based on the data in **Plate 4.7**, the annual growth rate of the Forth Islands SPA population averaged approximately 4.4% between 1985 and 2014. By 2014 the Forth Islands SPA population was probably close to carrying capacity, with further increase likely to be limited by the availability of suitable nesting areas on the Bass Rock (Murray et al. 2015, Harris et al. 2023). Under these circumstances, it is unlikely that the potential additional mortality predicted to arise from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects would lead to a decline in the Forth Islands SPA population because there would remain an excess of potential recruits to the population (noting that a 0.65% reduction to an annual growth rate of 4.4% would still result in a rapidly increasing population, in the event that the carrying capacity of the population had not been reached).
741. However, the abrupt and marked reduction in the Forth Islands SPA gannet population since the advent of HPAI in 2022 introduces greater uncertainty over the resilience of this population to further sources of increased mortality. The SPA population continues to remain considerably above the citation level and it seems likely that it will recover from the HPAI outbreak (given the evidence that in other respects environmental conditions remain highly suitable for the species) but this remains unknown at present. Given this, it is concluded that the potential for an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and (as outlined above) also in relation to both the predicted displacement and collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these effects are considered separately.
742. Consequently, it is concluded that there is the potential for an adverse effect on the Forth Islands SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.5.6 Assessment for the Breeding Seabird Assemblage

743. The breeding seabird assemblage for the Forth Islands SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that, as at 1986 – 1988, the SPA regularly supported 90,000 seabirds). Kittiwake, razorbill, puffin and gannet are amongst the 13 species identified in the citation as having nationally important populations which contribute to the Forth Islands SPA breeding seabird assemblage.
744. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA gannet population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. However, in relation to the SPA puffin and SPA kittiwake populations, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm

Infrastructure in-combination with other plans and projects. For the SPA razorbill population, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects, noting that if the assessment for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is undertaken, the potential for an adverse effect is identified for the SPA razorbill population. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake, razorbill, puffin and gannet are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, the potential for an adverse effect is identified only in relation to gannet (and only as a result of the in-combination effects).

745. The Forth Islands SPA gannet population is estimated to number 51,844 AOS. Given the size of this population, the fact that it is not subject to long-term decline and the scale of the potential impacts that are predicted, it is considered that there is no risk of the population being lost from the breeding seabird assemblage as a result of the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to gannet, it is concluded that the potential effects on this SPA population would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage. This conclusion remains unchanged if the potential in-combination effects on the SPA razorbill population were to be included. This is because there is considered to be no risk of this population being lost from the breeding seabird assemblage, given its current size (i.e. 8,379 individuals), the fact that it has increased over the long term and the scale of the potential impacts predicted to arise.
746. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Forth Islands SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.5.7 Site Conclusion

747. It is concluded that the possibility of an adverse effect cannot be excluded for the Forth Islands SPA population of breeding gannet, with the potential for an adverse effect arising from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA gannet population are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
748. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Forth Islands SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.6 Troup, Pennan and Lion's Heads SPA

4.4.6.1 European Site Information and Conservation Objectives

749. The Troup, Pennan and Lion's Heads SPA is a 9 km stretch of sea cliffs along the Aberdeenshire coast, situated approximately 148 km from the Bellrock WFDA. The boundary of the SPA overlaps with the boundary of Gamrie and Pennan coast SSSI and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1997, with the marine extension classified in 2009.
750. The Troup, Pennan and Lion's Heads SPA qualifies under Article 4.2 by regularly supporting populations of European importance of two migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including three species named only as component species (**Table 4.80**). The potential for LSE has been identified in relation to three of the five qualifying features or named components of the seabird assemblage feature (**Table 4.80**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
751. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
752. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
753. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.80: Details on the Qualifying Features of the Troup, Pennan and Lion's Heads SPA

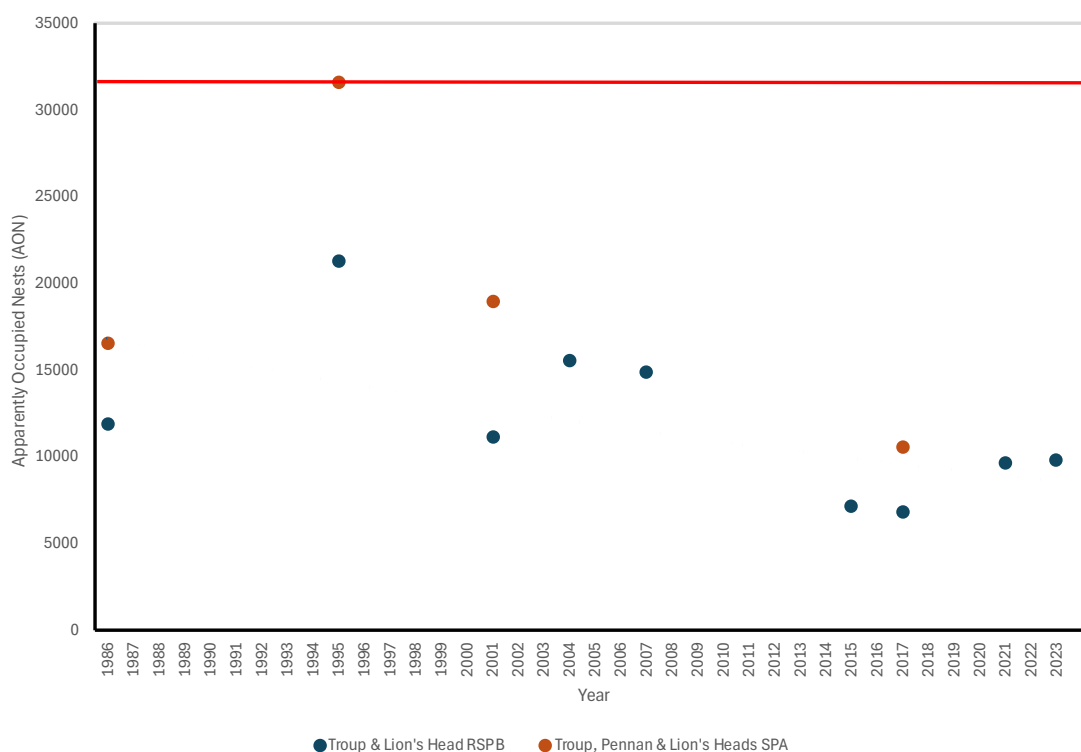
Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	150,000 individuals	Yes
Kittiwake	Breeding	Unfavourable declining	31,600 pairs	Yes

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Herring gull ¹	Breeding	Unfavourable declining	4,200 pairs	No
Guillemot	Breeding	Unfavourable recovering	44,600 individuals	No
Razorbill ¹	Breeding	Favourable recovered	4,800 individuals	Yes
Fulmar ¹	Breeding	Unfavourable, no change	4,400 pairs	No
Notes: ¹ Named component of the assemblage only.				

4.4.6.2 Assessment for the Kittiwake Population

754. The most recent full survey of the Troup, Pennan and Lion's Heads SPA kittiwake population derives from 2017, at which time the population was estimated to number 10,616 AONs, which is taken to equate to 21,232 breeding individuals (Burnell et al. 2023, JNCC and BTO, 2025). Subsequent surveys in 2021 and 2023 of the Troup and Lion's Heads RSPB reserve count sector (which holds the majority of the SPA kittiwake population) suggests a recent, limited, increase in population size since the 2017 count (JNCC and BTO, 2025, **Plate 4.8**). However, the longer term trend since at least the mid-1990s is one of decline, with the current population well below the citation level of 31,600 pairs (which also represents the peak count for the SPA population, as recorded in 1995 (**Plate 4.8**)) data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025).

Plate 4.8: Kittiwake Population Trend at Troup and Lion's Heads RSPB Reserve Between 1986 and 2023, With Counts for the Entire Troup, Pennan and Lion's Heads SPA Population Also Shown. The Troup and Lion's Heads RSPB Reserve Holds the Majority of the SPA Population. The Red Line Shows the Citation Population Size for the SPA (31,600 pairs)



4.4.6.2.1 The Potential for Impacts on the Kittiwake Population

755. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to restore the qualifying features to ensure they are viable components of the SPA*.

756. At a distance of 159 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Troup, Pennan and Lion's Heads SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Troup, Pennan and Lion's Heads SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Troup, Pennan and Lion's Heads SPA at any given time (Cleasby et al. 2018).

757. The apportioning calculations estimate that approximately 8% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Troup, Pennan and Lion's Heads SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Troup, Pennan and Lion's Heads SPA is somewhat lower than the estimated 8%.
758. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Troup, Pennan and Lion's Heads SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
759. Given the above, the Bellrock WFDA may have potential effects on Troup, Pennan and Lion's Heads SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.6.2.2 Project Alone: Construction and Decommissioning

4.4.6.2.2.1 Disturbance

760. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Troup, Pennan and Lion's Heads SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Troup, Pennan and Lion's Heads SPA (Cleasby et al. 2018).
761. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.6.2.2.2 Displacement

762. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Troup, Pennan and Lion's Heads SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Troup, Pennan and Lion's Heads SPA (Cleasby et al. 2018).

763. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.6.2.2.3 Changes to Prey Availability

764. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Troup, Pennan and Lion's Heads SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Troup, Pennan and Lion's Heads SPA (Cleasby et al. 2018).
765. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population.

4.4.6.2.3 Project Alone: Operation and Maintenance

4.4.6.2.3.1 Disturbance

766. The assessment of the potential effects of disturbance during the O&M phase on the Troup, Pennan and Lion's Heads SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Troup, Pennan and Lion's Heads SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Troup, Pennan and Lion's Heads SPA (Cleasby et al. 2018).
767. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population.

4.4.6.2.3.2 Displacement/Barrier Effects

768. The potential effects of displacement and barrier effects during the O&M phase on the Troup, Pennan and Lion's Heads SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3:**

Offshore Ornithology Displacement Assessment Report (Volume IV) and Table 4.81). The resultant seasonal mortality estimates were then apportioned to the Troup, Pennan and Lion's Heads SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.81**.

Table 4.81: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Troup, Pennan and Lion's Heads SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.079	0.079	0.1
Autumn passage	94	N/A	0.022	0.013	N/A
Spring passage	84	N/A	0.028	0.013	N/A

769.

Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Troup, Pennan and Lion's Heads SPA kittiwake population as a result of displacement is estimated to be 0.08 to 0.23 breeding adult birds and 0.01 to 0.03 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.82**). Over 70% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.82: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.060	0.004
	Autumn passage	30%	1%	0.007	0.004
	Spring passage	30%	1%	0.009	0.004
	Annual total	-	-	0.075	0.012
Upper mortality estimate	Breeding	30%	3%	0.188	0.013
	Autumn passage	30%	3%	0.017	0.010
	Spring passage	30%	3%	0.023	0.010
	Annual total	-	-	0.228	0.033

770. The additional annual mortality of adult kittiwakes from the Troup, Pennan and Lion's Heads SPA population predicted due to displacement from the Bellrock WFDA represents 0.0004% (lower estimate) to 0.0011% (upper estimate) of the current adult breeding population at this colony (i.e. 21,232 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.007%.
771. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.6.2.3.3 Collision Risk

772. The collision estimates for the Troup, Pennan and Lion's Heads SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Troup, Pennan and Lion's Heads SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
773. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.96 adult and 0.14 subadult birds (**Table 4.83**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0045% of the current adult breeding population at this colony (i.e. 21,232 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.031%.

Table 4.83: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Troup, Pennan and Lion's Heads SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.787	0.053
Autumn passage	0.092	0.054
Spring passage	0.082	0.036
Annual total	0.961	0.143

774. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.6.2.3.4 Combined Collisions and Displacement/Barrier Effects

775. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 1.04 and 1.19 adult and 0.15 and 0.18 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0049% to 0.0056% of the current adult breeding population at this colony (i.e. 21,232 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.034% and 0.038%.
776. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.6.2.3.5 Changes to Prey Availability

777. The assessment of the potential effects of changes to prey availability during the O&M phase on the Troup, Pennan and Lion's Heads SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Troup, Pennan and Lion's Heads SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the

Bellrock WFDA during the breeding season by kittiwake from the Troup, Pennan and Lion's Heads SPA (Cleasby et al. 2018).

778. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population.

4.4.6.2.4 Project Alone Conclusion

779. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Troup, Pennan and Lion's Heads SPA kittiwake population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.6.2.5 Effects In-combination

4.4.6.2.5.1 Effects of Relevance to the In-combination Assessment

780. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Troup, Pennan and Lion's Heads SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
781. Therefore, the potential for effects of the Bellrock Wind Farm Infrastructure to act on the Troup, Pennan and Lion's Heads SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.6.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

782. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Troup, Pennan and Lion's Heads SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
783. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.82**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt wind farm was excluded in all scenarios because the

consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).

784. Full details of the displacement mortality estimates for the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.84**).

Table 4.84: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	21.64	7.14
	Upper mortality estimate	55.31	21.43
Including Berwick Bank Wind Farm	Lower mortality estimate	23.78	8.08
	Upper mortality estimate	61.76	24.25
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

785. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 22 to 55 breeding adult birds and seven to 21 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 24 to 62 adults and eight to 24 subadults (**Table 4.84**).
786. In terms of the additional annual mortality of adult birds, these estimates represent 0.1019% (lower estimate) to 0.2605% (upper estimate) of the current adult breeding population at this colony (i.e. 21,232 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1120% (lower estimate) to 0.2909% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point

increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.698% to 1.784% (with the Berwick Bank Wind Farm effects excluded) and 0.777% to 1.992% (with the Berwick Bank Wind Farm effects included).

787. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.85: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	97,583	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	95,106	1.0331	0.9992	0.9711	47.28
	Upper mortality estimate	90,543	1.0317	0.9979	0.9257	42.64
Including Berwick Bank	Lower mortality estimate	94,903	1.0329	0.9991	0.9685	47.24
	Upper mortality estimate	89,742	1.0314	0.9976	0.9171	41.62

788. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 7% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.21% (**Table 4.85**). The metrics for the lower mortality estimates indicate reductions of

3% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.08% in the annual population growth rate.

789. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Troup, Pennan and Lion's Heads SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 7% and 3% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
790. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.6.2.5.3 Collision Risk – Operation and Maintenance

791. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Troup, Pennan and Lion's Heads SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
792. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm, whilst the collision estimate for the Green Volt wind farm was excluded from all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).
793. Full details of the collision estimates for the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.86**).

Table 4.86: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	58.82	31.21
Including Berwick Bank Wind Farm	67.46	34.66

794. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 59 to 67 breeding adult birds and 31 to 35 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.86**).
795. In terms of the additional annual mortality of adult birds, these estimates represent 0.2770% (Berwick Bank excluded) to 0.3177% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 21,232 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.897% (Berwick Bank excluded) to 2.176% (Berwick Bank included).
796. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.87: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	97,583	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	89,556	1.0314	0.9975	0.9149	41.38
Including Berwick Bank	88,612	1.0310	0.9972	0.9045	40.70

797. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 9% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.25% (**Table 4.87**).
798. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.6.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, which indicated a reduction of 8% (compared to 9% for the 35 year projections – **Table 4.87**) in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
799. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.6.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

800. The potential mortality attributed to the Troup, Pennan and Lion's Heads SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.88**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.6.2.5.2** and **Section 4.4.6.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.88: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	80.45	38.36
	Upper mortality estimate	114.13	52.64
Including Berwick Bank Wind Farm	Lower mortality estimate	91.25	42.75
	Upper mortality estimate	129.22	58.92
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.84 and Table 4.86 due to rounding errors.			

801. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 80 to 114 breeding adult birds and 38 to 53 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 91 to 129 adults and 43 to 59 subadults. These estimates represent 0.3789% (lower estimate) to 0.5375% (upper estimate) of the current adult breeding population at this colony (i.e. 21,232 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.4298% (lower estimate) to 0.6086% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.595% to 3.682% (with the Berwick Bank Wind Farm effects excluded) and 2.944% to 4.169% (with the Berwick Bank Wind Farm effects included).
802. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.88** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 15% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm

effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.46% (**Table 4.89**). The metrics for the lower mortality estimates indicate reductions of 11% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.33% in the annual population growth rate.

Table 4.89: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	97,583	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	86,908	1.0305	0.9967	0.8894	39.02
	Upper mortality estimate	82,857	1.0292	0.9954	0.8472	34.40
Including Berwick Bank	Lower mortality estimate	85,775	1.0301	0.9963	0.8758	37.66
	Upper mortality estimate	81,053	1.0285	0.9948	0.8295	32.20

803. As for the PVAs detailed in **Section 4.4.6.2.5.2** and **Section 4.4.6.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 15% and 11% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.6.2.6 In-combination Conclusion

804. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Troup, Pennan and Lion's Heads SPA kittiwake population is predicted to cause the population to be up to 15% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Troup, Pennan and Lion's Heads SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025).

It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

805. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the decline of the Troup, Pennan and Lion's Heads SPA kittiwake population (for which there is indication of recent stabilisation) and its 'unfavourable declining' condition status (**Table 4.80**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
806. Consequently, it is concluded that there is the potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.4.1.2.5.4**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.6.3 Assessment for the Razorbill Population

807. The Troup, Pennan and Lion's Heads SPA razorbill population is currently estimated to number 6,054 breeding adults, based upon the most recently available count data for the whole colony from 2017 (Burnell et al. 2023, JNCC and BTO, 2025). Razorbill is listed on the Troup, Pennan and Lion's Heads SPA citation as a named component of the breeding seabird assemblage, with a citation population size of 4,800 individuals (**Table 4.80**). Count data for the population are sporadic but indicate that numbers increased markedly between the mid-1980s and early 2000s (with population estimates of 1,647 and 6,644 individuals for 1986 and 2001, respectively) before undergoing a slight decline to the current levels but the overall, long-term, trend is increasing (JNCC and BTO, 2025). The current population size exceeds the citation level, and the population is considered to be in a 'favourable recovered' condition (**Table 4.80**).

4.4.6.3.1 The Potential for Impacts on the Razorbill Population

808. The Bellrock WFDA plus 2 km buffer does not overlap with the Troup, Pennan, and Lion's Heads SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain, in the long term, the population of the species as a viable component of the site.*'
809. At a distance of 159 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Troup, Pennan, and Lion's Heads SPA is beyond the mean maximum plus one standard deviation of the breeding season foraging range (i.e. the metric used to determine breeding season connectivity) for razorbill when data from the Fair Isle colony are excluded (which is in accordance with NatureScot guidance for SPAs that are to the south of the Pentland Firth (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward

et al. 2019, NatureScot, 2023a)). Consequently, there is deemed to be no breeding season connectivity with the Bellrock WFDA and, hence, no potential for breeding season impacts on the Troup, Pennan and Lion's Heads SPA razorbill population.

810. In the non-breeding period razorbills tend to move to central areas of the North Sea during the mid-winter period (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Troup, Pennan and Lion's Heads SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods, and potentially the winter period as well (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).

811. Given the above, the Bellrock WFDA may have potential effects on Troup, Pennan and Lion's Heads SPA razorbill population during non-breeding periods only.

4.4.6.3.2 Project Alone: Construction and Decommissioning

4.4.6.3.2.1 Disturbance

812. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.1**) except that, importantly, the Troup, Pennan and Lion's Heads SPA is beyond the distance for breeding season connectivity of razorbills and, consequently, only non-breeding period impacts are assessed. As outlined in **Section 4.4.2.3.2.1**, the potential for effects of construction-related disturbance on SPA razorbill populations is generally lower during the non-breeding periods than during the breeding season.

813. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA razorbill population (and noting that there is no breeding season connectivity for the Troup, Pennan and Lion's Heads SPA razorbill population), it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.6.3.2.2 Displacement

814. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.2**) but noting, as in **Section 4.4.6.3.2.1** above, that the Troup, Pennan and Lion's Heads SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).

815. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA razorbill population (and noting that there is no breeding season connectivity for the Troup, Pennan

and Lion's Heads SPA razorbill population), it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.6.3.2.3 Changes to Prey Availability

816. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Troup, Pennan and Lion's Heads SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.3**) but noting, as in **Section 4.4.6.3.2.1** above, that the Troup, Pennan and Lion's Heads SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
817. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA razorbill population (and noting that there is no breeding season connectivity for the Troup, Pennan and Lion's Heads SPA razorbill population), it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population.

4.4.6.3.3 *Project Alone: Operation and Maintenance*

4.4.6.3.3.1 Disturbance

818. The assessment of the potential effects of disturbance during the O&M phase on the Troup, Pennan and Lion's Heads SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, but noting, as in **Section 4.4.6.3.2.1** above, that the Troup, Pennan and Lion's Heads SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
819. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population.

4.4.6.3.3.2 Displacement/Barrier Effects

820. The potential effects of displacement and barrier effects during the O&M phase on the Troup, Pennan and Lion's Heads SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.90**). The resultant mortality estimates for the non-breeding periods were then apportioned to the Troup, Pennan and Lion's Heads SPA and to the adult and subadult age classes using the BDMPS approach, as detailed in

Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV) and summarised in **Table 4.90** (Furness, 2015).

Table 4.90: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Troup, Pennan and Lion's Heads SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	N/A	N/A	0.07
Autumn passage	0	N/A	0.006	0.004	N/A
Winter	6	N/A	0.005	0.001	N/A
Spring passage	82	N/A	0.006	0.004	N/A

821.

Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Troup, Pennan and Lion's Heads SPA razorbill population as a result of displacement is estimated to be 0.004 to 0.011 breeding adult birds and 0.002 to 0.007 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.91**). As detailed above, all of the potential mortality from displacement is predicted to occur during the non-breeding periods because of the lack of connectivity during the breeding season.

Table 4.91: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.004	0.002
	Annual total	-	-	0.004	0.002
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.000	0.000
	Spring passage	60%	3%	0.011	0.007
	Annual total	-	-	0.011	0.007

822. The additional annual mortality of adult razorbills from the Troup, Pennan and Lion's Heads SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0002% (upper estimate) of the current adult breeding population at this colony (i.e. 6,054 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.0006% and 0.002%.
823. Based upon the above, the potential levels of impact on the Troup, Pennan and Lion's Heads SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.6.3.3.3 Secondary Entanglement

824. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Troup, Pennan and Lion's Heads SPA).
825. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population as a result of secondary entanglement.

4.4.6.3.3.4 Changes to Prey Availability

826. The assessment of the potential effects of changes to prey availability during the O&M phase on the Troup, Pennan and Lion's Heads SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population but noting, as in **Section 4.4.6.3.2.1** above, that the Troup, Pennan and Lion's Heads SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
827. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the Troup, Pennan and Lion's Heads SPA razorbill population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population.

4.4.6.3.4 *Project Alone Conclusion*

828. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Troup, Pennan and Lion's Heads SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one hundredth of an adult bird and only 0.0002% of the SPA population (with this population having shown a long term increase overall), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Troup, Pennan and Lion's Heads SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.6.3.5 *Effects In-combination*

4.4.6.3.5.1 *Effects of Relevance to the In-combination Assessment*

829. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Troup, Pennan and Lion's Heads SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
830. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the Troup, Pennan and Lion's Heads SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.6.3.5.2 *Displacement/Barrier Effects*

831. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Troup, Pennan and Lion's Heads SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
832. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.91**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).

833. Full details of the displacement mortality estimates for the Troup, Pennan and Lion's Heads SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.92**).

Table 4.92: Potential Annual Mortality of Troup, Pennan and Lion's Heads SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	10.74	6.23
	Upper mortality estimate	24.58	14.60
Including Berwick Bank Wind Farm	Lower mortality estimate	12.15	7.23
	Upper mortality estimate	27.76	16.80
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

834. The potential mortality on the Troup, Pennan and Lion's Heads SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is three to four orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 11 to 25 adult birds and six to 15 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 12 to 28 adults and seven to 17 subadults (**Table 4.92**).
835. In terms of the additional annual mortality of adult birds, these estimates represent 0.1773% (lower estimate) to 0.4060% (upper estimate) of the current adult breeding population at this colony (i.e. 6,054 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.2008% (lower estimate) to 0.4586% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population

(which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.689% to 3.867% (with the Berwick Bank Wind Farm effects excluded) and 1.912% to 4.368% (with the Berwick Bank Wind Farm effects included).

836. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.93: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Troup, Pennan and Lion's Heads SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	18,670	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	17,635	1.0230	0.9980	0.9430	43.00
	Upper mortality estimate	16,327	1.0210	0.9960	0.8730	35.20
Including Berwick Bank	Lower mortality estimate	17,478	1.0230	0.9980	0.9360	42.00
	Upper mortality estimate	15,489	1.0200	0.9950	0.8280	30.30

837. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). Based on the predicted impacts for this in-combination scenario, the CPS value for the upper mortality estimate indicates a reduction of 13% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.4% (**Table 4.93**). The metrics for the lower mortality estimates indicate reductions of 6% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.2% in the annual population growth rate.

838. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Troup, Pennan and Lion's Heads SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 13% and 6% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.6.3.6 *In-combination Conclusion*

839. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Troup, Pennan and Lion's Heads SPA razorbill population is predicted to cause the population to be up to 13% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Troup, Pennan and Lion's Heads SPA razorbill) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.6.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one hundredth of an adult bird, representing only 0.0002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
840. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has shown a strong long-term increase, overall, and which is currently above the citation level. The SPA population has a 'favourable recovered' condition status (**Table 4.80**). Given this, it is concluded that there is no potential for an adverse effect on the Troup, Pennan and Lion's Heads SPA razorbill population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
841. It is important to consider that this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA razorbill populations, which have been outlined in **Section 4.2.2**.

4.4.6.4 **Assessment for the Breeding Seabird Assemblage**

842. The breeding seabird assemblage for the Troup, Pennan and Lion's Heads SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 150,000 seabirds). Kittiwake is a qualifying feature of the SPA in its own right, whilst razorbill is one of the species identified in the citation as contributing to the SPA breeding seabird assemblage.

843. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. However, in relation to the SPA razorbill population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake and razorbill are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, the potential for an adverse effect is identified only in relation to kittiwake (and only as a result of the in-combination effects).
844. The Troup, Pennan and Lion's Heads SPA kittiwake population is currently estimated to number 10,616 AONs. Given the size of this population and the scale of the potential impacts, it is considered that there is no risk of this population being lost from the breeding seabird assemblage due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to kittiwake, it is concluded that the potential effect on the SPA kittiwake population would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage.
845. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Troup, Pennan and Lion's Heads SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.6.5 Site Conclusion

846. It is concluded that the possibility of an adverse effect cannot be excluded for the Troup, Pennan and Lion's Heads SPA population of breeding kittiwake. For the kittiwake population, the potential for an adverse effect arises from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA kittiwake population are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
847. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Troup, Pennan and Lion's Heads SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.7 Coquet Island SPA

4.4.7.1 European Site Information and Conservation Objectives

848. Coquet Island is located 1 km off the coast of Northumberland in northeast England and approximately 182 km from the Bellrock WFDA. It is a small, flat-topped island with a plateau extent of approximately 7 ha. Coquet Island SPA was first classified in 1985 for its breeding seabirds, with the surrounding marine environment protected by the Northumberland Marine SPA, which was classified in 2017, in part, to protect the foraging areas of the qualifying features of the Coquet Island SPA.
849. Coquet Island SPA qualifies under Article 4.1 by regularly supporting populations of European importance of four Annex I species, as well as qualifying under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including five species named only as component species (**Table 4.94**). The potential for LSE has been identified in relation to two of the nine qualifying features or components of the seabird assemblage feature (**Table 4.94**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
850. The conservation objectives of this SPA (as determined through [Natural England's Access to Evidence](#)) are to:
- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
 - The extent and distribution of the habitats of the qualifying features;
 - The structure and function of the habitats of the qualifying features;
 - The supporting processes on which the habitats of the qualifying features rely;
 - The populations of each of the qualifying features; and
 - The distribution of qualifying features within the site.
851. Further information on this European Site, including the Supplementary Advice on Conservation Objectives (SACOs) is available Natural England's Designated Sites View (Natural England, 2023b).
852. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
853. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

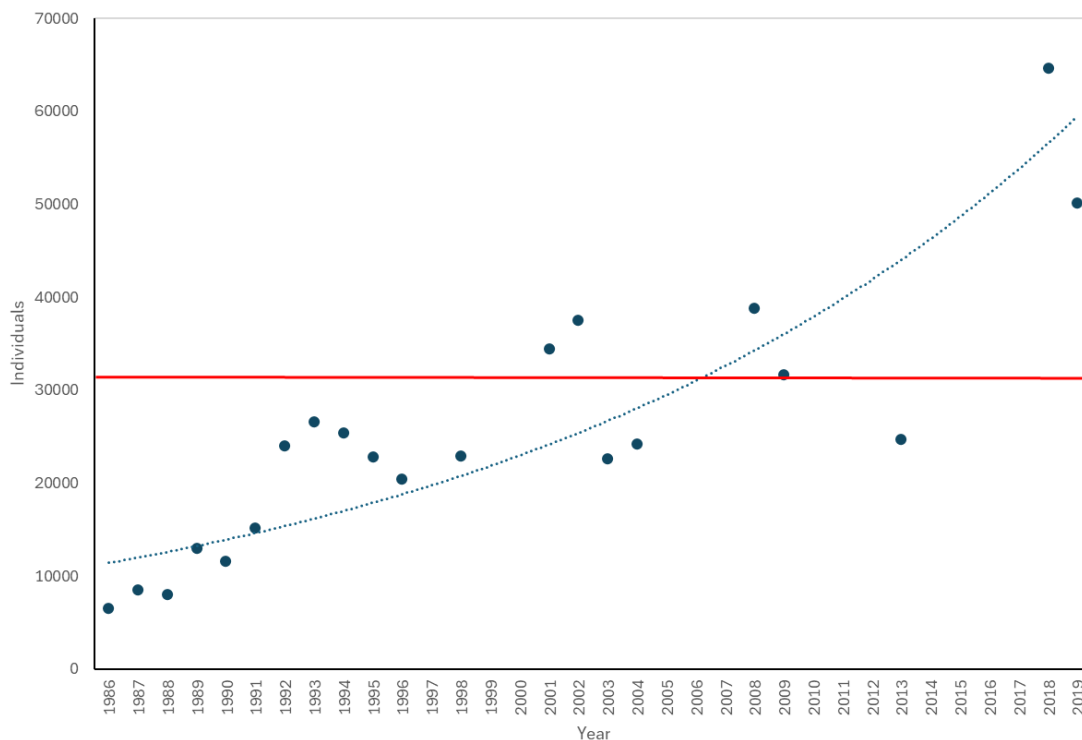
Table 4.94: Details on the Qualifying Features of the Coquet Island SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Not available	47,662 individuals	Yes
Black-headed gull ¹	Breeding	Not available	7,772 individuals	No
Herring gull ¹	Breeding	Not available	Not available	No
Lesser black-backed gull ¹	Breeding	Not available	Not available	No
Sandwich tern	Breeding	Not available	2,600 individuals	No
Roseate tern	Breeding	Not available	160 individuals	No
Common tern	Breeding	Not available	2,378 individuals	No
Arctic tern	Breeding	Not available	2,460 individuals	No
Puffin ¹	Breeding	Not available	31,686 individuals	Yes
Fulmar ¹	Breeding	Not available	Not available	No
Notes:				
¹ Named component of the assemblage only.				

4.4.7.2 Assessment for the Puffin Population

854. The most recently available complete count of the Coquet Island SPA puffin population derives from 2019, giving an estimate of 25,029 AOB (which is taken to equate to 50,058 breeding individuals) (Burnell et al. 2023, JNCC and BTO, 2025). Puffin are listed on the Coquet SPA citation as a named component of the breeding seabird assemblage, with a citation population size of 31,636 individuals. The SPA population has shown a consistent and marked increase in numbers over the long-term, with the current population size considerably above the citation level (**Plate 4.9**).

Plate 4.9: Puffin Population Trend at Coquet Island SPA between 1986 and 2024. The Red Line Shows the Citation Population Size for Coquet Island SPA (31,636 Individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)



4.4.7.2.1 The Potential for Impacts on the Puffin Population

855. The Bellrock WFDA plus 2 km buffer does not overlap with the Coquet Island SPA, so that potential impacts on its puffin population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain and restore, the population of each of the qualifying features*' because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary. In terms of the SACOs, this focus is most closely reflected in the attributes concerned with the abundance and diversity of the species assemblage which have the targets of maintaining; (i) the abundance of the breeding seabird assemblage qualifying feature at a level above 47,662 individuals, whilst avoiding deterioration from its current levels; and (ii) the species diversity of the breeding seabird assemblage qualifying feature (Natural England, 2023b).
856. At a distance of 182 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Coquet Island SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for puffin, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of puffin (62.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Coquet Island SPA puffins during the breeding season is likely to be low, despite the potential for connectivity.

857. The apportioning calculations estimate that approximately 19% of the puffins occurring on the Bellrock WFDA during the breeding season derive from this SPA colony, although only 55% of these birds are assumed to be breeding adults (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The breeding season for puffin is defined as April to mid-August, following the NatureScot (2020b) guidance.
858. For the same reasons as detailed for the Farne Islands SPA puffin population (see **Section 4.4.4.3.1**), quantitative assessment of the Coquet Island SPA puffin population is limited to the breeding season (with qualitative consideration of potential non-breeding period impacts included within the conclusions for the Bellrock Wind Farm Infrastructure alone – see **Section 4.4.7.2.4**). This is in accordance with NatureScot advice (**Table 1.1**).

4.4.7.2.2 Project Alone: Construction and Decommissioning

4.4.7.2.2.1 Disturbance

859. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Coquet Island SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the Coquet Island SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
860. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Farnes Island SPA puffin population are presented in **Section 4.4.4.3.2.1**. On the basis of these details as applied to the Coquet Island SPA puffin population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.2.2 Displacement

861. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Coquet Island SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the Coquet Island SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
862. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.2**. On the basis of these details as applied to the Coquet Island SPA puffin population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.2.3 Changes to Prey Availability

863. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Coquet Island SPA puffin population is essentially as for the Farne Islands SPA puffin population noting that the Coquet Island SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
864. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.3**. On the basis of these details as applied to the Coquet Island

SPA puffin population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.3 *Project Alone: Operation and Maintenance*

4.4.7.2.3.1 Disturbance

865. The assessment of the potential effects of disturbance during the O&M phase on the Coquet Island SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the Coquet Island SPA is further from the Bellrock WFDA than is the Farne Islands SPA.

866. The details of the assessment of the potential effects of disturbance during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.3.1**. On the basis of these details as applied to the Coquet Island SPA puffin population, it is considered that there is no potential for O&M related disturbance to lead to an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.3.2 Displacement/Barrier Effects

867. The potential effects of displacement and barrier effects during the O&M phase on the Coquet Island SPA puffin population were assessed using the approach and methods outlined for the Farne Island SPA puffin population in **Section 4.4.4.3.3.2**. Thus, the displacement and mortality rates advised for puffin by NatureScot (2023d) were applied to the mean peak population sizes of puffin within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.95**). For puffin SPA populations, quantitative consideration of effects is limited to the breeding season (in accordance with NatureScot advice – **Table 1.1, Section 4.4.4.3.1**). Therefore, the resultant breeding season mortality estimate was apportioned to the Coquet Island SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.95**.

Table 4.95: Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the Coquet Island SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	360	0.549	0.192	0.192	0.07

868. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Coquet Island SPA puffin population as a result of displacement is estimated to be 0.6 to 1.1 breeding adult birds and 0.6 to 0.9 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.96**).

Table 4.96: Potential Annual Mortality of Coquet Island SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.641	0.566
	Non-breeding	N/A	N/A	NA	NA
	Annual total	-	-	0.641	0.566
Upper mortality estimate	Breeding	60%	5%	1.065	0.940
	Non-breeding	N/A	N/A	NA	NA
	Annual total	-	-	1.065	0.940

869. The additional annual mortality of adult puffins from the Coquet Island SPA population predicted due to displacement from the Bellrock WFDA represents 0.0013% (lower estimate) to 0.0021% (upper estimate) of the current adult breeding population at this colony (i.e. 50,058 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.10 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.013% and 0.021%.

870. Based upon the above, the potential levels of impact on the Coquet Island SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.7.2.3.3 Changes to Prey Availability

871. The assessment of the potential effects of changes to prey availability during the O&M on the Coquet Island SPA puffin population is essentially as for the Farne Islands SPA puffin population noting that the Coquet Island SPA is further from the Bellrock WFDA than is the Farne Islands SPA.

872. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.3**. On the basis of these details as applied to the Coquet Island SPA puffin population, it is considered that

there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.3.4 Secondary Entanglement

873. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including puffins from the Coquet Island SPA).
874. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Coquet Island SPA puffin population as a result of secondary entanglement.

4.4.7.2.4 Project Alone Conclusion

875. The potential effects, as considered in **Section 4.4.7.2.2.1** to **Section 4.4.7.2.3.4** above, from the Bellrock Wind Farm Infrastructure alone on the Coquet Island SPA puffin population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. As outlined in **Section 4.4.7.2.1**, the assessment for the SPA population focusses on breeding season effects, in accordance with NatureScot advice (**Table 1.1**). This is because puffins migrate rapidly from their UK breeding areas, dispersing widely across northwest European seas and the Atlantic, so that puffins occurring within the Bellrock WFDA and 2 km buffer during the non-breeding period are unlikely to derive from Coquet Island SPA population. This, together with the low numbers of puffins recorded during the non-breeding period in the baseline DAS (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**), means that effects on the SPA population from the Bellrock Wind Farm Infrastructure alone during the non-breeding period are highly unlikely.
876. Based upon the above considerations, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on the Coquet Island SPA puffin population.

4.4.7.2.5 Effects In-combination

4.4.7.2.5.1 Effects of Relevance to the In-combination Assessment

877. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Coquet Island SPA puffin population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

878. Therefore, the potential for effects of the Bellrock WFDA to act on the Coquet Island SPA puffin population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) effect pathway during O&M.

4.4.7.2.5.2 Displacement/Barrier Effects

879. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Coquet Island SPA puffin population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
880. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.97**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
881. Full details of the displacement mortality estimates for the Coquet Island SPA puffin population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.97**).

Table 4.97: Potential Annual Mortality of Coquet Island SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	12.66	3.30
	Upper mortality estimate	19.90	5.49
Including Berwick Bank Wind Farm	Lower mortality estimate	16.26	8.16
	Upper mortality estimate	25.90	13.59
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%, respectively.			

882. The potential mortality on the Coquet Island SPA puffin population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is an order of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 13 to 20 breeding adult birds and three to five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 16 to 26 adults and eight to 14 subadults (**Table 4.97**).
883. In terms of the additional annual mortality of adult birds, these estimates represent 0.0253% (lower estimate) to 0.0398% (upper estimate) of the current adult breeding population at this colony (i.e. 50,058 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0325% (lower estimate) to 0.0517% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.1 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.253% to 0.398% (with the Berwick Bank Wind Farm effects excluded) and 0.325% to 0.517% (with the Berwick Bank Wind Farm effects included).
884. The PVA methodology and descriptions of outputs are as detailed in **Section 4.4.1.2.5.2**. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.98: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Coquet Island SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	38,949	0.9948	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	38,666	0.9945	0.9998	0.9920	49.66
	Upper mortality estimate	38,444	0.9944	0.9997	0.9873	49.14
Including Berwick Bank	Lower mortality estimate	38,454	0.9944	0.9997	0.9884	49.20
	Upper mortality estimate	38,184	0.9942	0.9995	0.9818	48.76

885. No adverse effect on the Coquet Island SPA puffin population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 2% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.05% (**Table 4.98**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.03% in the annual population growth rate.
886. In addition to projecting the PVAs over a 35 year period, 50 year projections were also undertaken in which the wind farm effects were incorporated for the first 35 years followed by a 15 year recovery period without any wind farm effects. In terms of the CPS and CPGR metrics, these 50 year projections gave very similar outputs to the 35 year projections for the displacement effects on the SPA puffin population. Thus, there were very small decreases in the predicted level of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 2% and 1% for the upper and lower displacement mortality estimates, respectively (**Table 3.4 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
887. Based upon the above, the potential levels of impact on the Coquet Island SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.7.2.6 In-combination Conclusion

888. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Coquet Island SPA puffin population is predicted to cause the population to be up to 2% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Coquet Island SPA puffin population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Coquet Island SPA puffin population (Marine Directorate, 2025).
889. The small scale of the potential reduction in the size of the SPA population associated with the in-combination effects should also be considered within the context of a population for which the overall trend since the late 1980s has been increasing and which is currently substantially above the citation level (**Table 4.94, Plate 4.9**). Consequently, it is concluded that there is no potential for an adverse effect on the Coquet Island puffin population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As outlined in **Section 4.2.2**, this conclusion is reached within the context of a range of precautionary assumptions incorporated into the assessment of SPA puffin populations.

4.4.7.3 Assessment for the Breeding Seabird Assemblage

890. The breeding seabird assemblage for the Coquet Island SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 47,662 individual breeding seabirds). Puffin is one of six species identified in the citation as having nationally important populations which contribute to the Coquet Island SPA breeding seabird assemblage.
891. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA puffin population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that puffin is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
892. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Coquet Island SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.7.4 Site Conclusion

893. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Coquet Island SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Coquet Island SPA.

4.4.8 East Caithness Cliffs SPA

4.4.8.1 European Site Information and Conservation Objectives

894. The East Caithness Cliffs SPA includes most of the sea-cliff areas between Wick and Helmsdale on the northeast coast of the Scottish mainland. The SPA is located approximately 238 km from the Bellrock WFDA. The boundary of the SPA overlaps either partly or wholly with Castle of Old Wick to Craig Hammel SSSI, Craig Hammel to Sgaps Geo SSSI, Dunbeath to Sgaps Geo SSSI, Berriedale Cliffs SSSI, Ousdale Burn SSSI and Helmsdale Coast SSSI. The SPA was classified in 1996, with a marine extension classified in 2009. The seaward extension extends approximately 2 km into the marine environment.
895. East Caithness Cliffs SPA qualifies under Article 4.1 by regularly supporting a population of European importance of one Annex I species, as well as qualifying under Article 4.2 by regularly supporting populations of European importance of five migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including three species named only as component species (**Table 4.99**). The potential for LSE has been identified in relation to three of the nine qualifying features or named components of the seabird assemblage feature (**Table 4.99**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.

896. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:

- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.

897. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.99: Details on the Qualifying Features of the East Caithness Cliffs SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	300,000 individuals	Yes
Kittiwake	Breeding	Favourable maintained	32,500 pairs	Yes
Great black-backed gull ¹	Breeding	Unfavourable, no change	800 pairs	Yes
Herring gull	Breeding	Unfavourable, no change	9,400 pairs	No
Guillemot	Breeding	Favourable maintained	106,700 individuals	No
Razorbill	Breeding	Favourable maintained	15,800 individuals	Yes
Fulmar ¹	Breeding	Favourable maintained	15,000 pairs	No
Cormorant ¹	Breeding	Unfavourable declining	230 pairs	No
Shag	Breeding	Unfavourable, no change	2,300 pairs	No
Peregrine	Breeding	Favourable maintained	6 pairs	No

Notes:

¹ Named component of the assemblage only.

4.4.8.2 Assessment for the Kittiwake Population

898. The East Caithness Cliffs SPA kittiwake population is currently estimated to number 18,300 AONs (taken to equate to 36,600 breeding individuals) based upon the most recently available count data which derive almost entirely from 2024 (JNCC and BTO, 2025). There are few previous estimates available for this SPA population but the number of AONs was estimated as 24,479 for the period 2015 – 2021 and as approximately 40,400 in 1999 (Burnell et al. 2023). Thus, the available data suggest a 55% decline in numbers over the past 25 years or so, with the current population size considerably below the citation level of 32,500 pairs (**Table 4.99**). Despite this marked decline, the SPA population is considered to have a 'favourable maintained' condition status.

4.4.8.2.1 The Potential for Impacts on the Kittiwake Population

899. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain and restore the qualifying features to ensure they are viable components of the SPA*'.
900. At a distance of 238 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the East Caithness Cliffs SPA is within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by East Caithness Cliffs SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the East Caithness Cliffs SPA at any given time (Cleasby et al. 2018).
901. The apportioning calculations estimate that approximately 8% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by East Caithness Cliffs SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the East Caithness Cliffs SPA is somewhat lower than the estimated 8%.
902. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the East Caithness Cliffs SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
903. Given the above, the Bellrock WFDA may have potential effects on East Caithness Cliffs SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the

breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.8.2.2 Project Alone: Construction and Decommissioning

4.4.8.2.2.1 Disturbance

904. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the East Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the East Caithness Cliffs SPA is considerably further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the East Caithness Cliffs SPA (Cleasby et al. 2018).
905. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the East Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.8.2.2.2 Displacement

906. The assessment of the potential effects of displacement during the construction and decommissioning phases on the East Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the East Caithness Cliffs SPA is considerably further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the East Caithness Cliffs SPA (Cleasby et al. 2018).
907. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the East Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.8.2.2.3 Changes to Prey Availability

908. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the East Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the East Caithness Cliffs SPA is considerably further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the East Caithness Cliffs (Cleasby et al. 2018).
909. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake

population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the East Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the East Caithness Cliffs SPA kittiwake population.

4.4.8.2.3 *Project Alone: Operation and Maintenance*

4.4.8.2.3.1 Disturbance

910. The assessment of the potential effects of disturbance during the O&M phase on the East Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the East Caithness Cliffs SPA is considerably further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the East Caithness Cliffs SPA (Cleasby et al. 2018).
911. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the East Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the East Caithness Cliffs SPA kittiwake population.

4.4.8.2.3.2 Displacement/Barrier Effects

912. The potential effects of displacement and barrier effects during the O&M phase on the East Caithness Cliffs SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.100**). The resultant seasonal mortality estimates were then apportioned to the East Caithness Cliffs SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.100**.

Table 4.100: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the East Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.079	0.079	0.1
Autumn passage	94	N/A	0.058	0.034	N/A
Spring passage	84	N/A	0.077	0.034	N/A

913. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the East Caithness Cliffs SPA kittiwake population as a result of displacement is estimated to be 0.10 to 0.30 breeding adult birds and 0.03 to 0.07 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.101**). Just over half of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.101: Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.060	0.004
	Autumn passage	30%	1%	0.018	0.010
	Spring passage	30%	1%	0.023	0.010
	Annual total	-	-	0.101	0.025
Upper mortality estimate	Breeding	30%	3%	0.188	0.013
	Autumn passage	30%	3%	0.047	0.027
	Spring passage	30%	3%	0.062	0.027
	Annual total	-	-	0.296	0.067

914. The additional annual mortality of adult kittiwakes from the East Caithness Cliffs SPA population predicted due to displacement from the Bellrock WFDA represents 0.0003% (lower estimate) to 0.0008% (upper estimate) of the current adult breeding population at this colony (i.e. 36,600 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.006%.
915. Based upon the above, the potential levels of impact on the East Caithness Cliffs SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.8.2.3.3 Collision Risk

916. The collision estimates for the East Caithness Cliffs SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the East Caithness Cliffs SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
917. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 1.26 adult and 0.30 subadult birds (**Table 4.102**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.003% of the current adult breeding population at this colony (i.e. 36,600 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.024%.

Table 4.102: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the East Caithness Cliffs SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.787	0.053
Autumn passage	0.249	0.146
Spring passage	0.222	0.098
Annual total	1.258	0.296

918. Based upon the above, the potential levels of impact on the East Caithness Cliffs SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.8.2.3.4 Combined Collisions and Displacement/Barrier Effects

919. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between one and two adult and 0.32 and 0.36 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. These potential levels of additional mortality of adult birds represent 0.0037% to 0.0042% of the current adult breeding population at this colony (i.e. 36,600 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.025% and 0.029%.
920. Based upon the above, the potential levels of impact on the East Caithness Cliffs SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.8.2.3.5 Changes to Prey Availability

921. The assessment of the potential effects of changes to prey availability during the O&M phase on the East Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the East Caithness Cliffs SPA is considerably further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that the modelling of foraging distributions from tracking data also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the East Caithness Cliffs SPA (Cleasby et al. 2018).
922. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the East Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the East Caithness Cliffs SPA kittiwake population.

4.4.8.2.4 Project Alone Conclusion

923. The potential effects from the Bellrock Wind Farm Infrastructure alone on the East Caithness Cliffs SPA kittiwake population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.8.2.5 *Effects In-combination*

4.4.8.2.5.1 *Effects of Relevance to the In-combination Assessment*

924. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the East Caithness Cliffs SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
925. Therefore, the potential for effects of the Bellrock WFDA to act on the East Caithness Cliffs SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.8.2.5.2 *Displacement/Barrier Effects – Operation and Maintenance*

926. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the East Caithness Cliffs SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
927. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.101**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt wind farm was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).
928. Full details of the displacement mortality estimates for the East Caithness Cliffs SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.103**).

Table 4.103: Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	68.82	20.15
	Upper mortality estimate	198.86	60.45
Including Berwick Bank Wind Farm	Lower mortality estimate	74.02	22.71
	Upper mortality estimate	214.46	68.12
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

929. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 69 to 199 breeding adult birds and 20 to 60 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 74 to 214 adults and 23 to 68 subadults (**Table 4.103**).
930. In terms of the additional annual mortality of adult birds, these estimates represent 0.1880% (lower estimate) to 0.5433% (upper estimate) of the current adult breeding population at this colony (i.e. 36,600 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.2023% (lower estimate) to 0.5860% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.288% to 3.721% (with the Berwick Bank Wind Farm effects excluded) and 1.385% to 4.013% (with the Berwick Bank Wind Farm effects included).
931. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm

Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.104: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	151,586	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	143,765	1.0322	0.9985	0.9485	44.66
	Upper mortality estimate	129,871	1.0294	0.9957	0.8575	34.80
Including Berwick Bank	Lower mortality estimate	143,297	1.0321	0.9984	0.9445	44.28
	Upper mortality estimate	128,137	1.0290	0.9954	0.8460	33.54

932. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the East Caithness Cliffs SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value for the upper mortality estimate for this in-combination scenario indicate a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.43% (**Table 4.104**). The metrics for the lower mortality estimates indicate reductions of 5% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.15% in the annual population growth rate.

933. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the East Caithness Cliffs SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence

of any wind farm effects) remained at 14% and 5% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

934. The scale of the potential reduction in the size of the East Caithness Cliffs SPA population associated with the upper estimate of the in-combination displacement mortality should be considered within the context of the marked decline in the population since at least the late 1990s, with the population currently considerably below the citation level (**Section 4.4.8.2, Table 4.99**). Given this, it is concluded that the possibility of an adverse effect on the SPA population as a result of the predicted displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects cannot be excluded.

4.4.8.2.5.3 Collision Risk – Operation and Maintenance

935. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the East Caithness Cliffs SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**),
936. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm, whilst the collision estimate for the Green Volt wind farm was excluded from all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA kittiwake population (**Table 1.1**, Marine Directorate 2024).
937. Full details of the collision estimates for the East Caithness Cliffs SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.105**).

Table 4.105: Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	188.49	75.38
Including Berwick Bank Wind Farm	206.98	84.54

938. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from 188 to 207 breeding adult birds and 75 to 85 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.105**).
939. In terms of the additional annual mortality of adult birds, these estimates represent 0.5150% (Berwick Bank excluded) to 0.5655% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 36,600 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality.
940. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.527% (Berwick Bank excluded) to 3.873% (Berwick Bank included).
941. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.106: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	151,586	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	130,162	1.0293	0.9957	0.8574	35.00
Including Berwick Bank	128,039	1.0289	0.9953	0.8438	33.50

942. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the East Caithness Cliffs SPA kittiwake

population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.43% (**Table 4.106**).

943. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.8.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections.
944. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 14% (**Table 3.2 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
945. The scale of the potential reduction in the size of the East Caithness Cliffs SPA population associated with the in-combination collision mortality should be considered within the context of the marked decline in the population since at least the late 1990s, with the population currently considerably below the citation level (**Section 4.4.8.2, Table 4.99**). Given this, it is concluded that the possibility of an adverse effect on the SPA population as a result of the predicted collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects cannot be excluded.

4.4.8.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

946. The potential mortality attributed to the East Caithness Cliffs SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.107**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.8.2.5.2** and **Section 4.4.8.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.107: Potential Annual Mortality of East Caithness Cliffs SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	257.31	95.53
	Upper mortality estimate	387.35	135.83
Including Berwick Bank Wind Farm	Lower mortality estimate	281.01	107.24
	Upper mortality estimate	421.45	152.65

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Notes:			
¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			
² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.103 and Table 4.105 due to rounding errors.			

947. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 257 to 387 breeding adult birds and 96 to 136 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 281 to 421 adults and 107 to 153 subadults. These estimates represent 0.7030% (lower estimate) to 1.0583% (upper estimate) of the current adult breeding population at this colony (i.e. 36,600 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.7678% (lower estimate) to 1.1515% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 4.815% to 7.249% (with the Berwick Bank Wind Farm effects excluded) and 5.259% to 7.887% (with the Berwick Bank Wind Farm effects included).
948. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.107** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 26% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.85% (
949. Table 4.108). The metrics for the lower mortality estimates indicate reductions of 19% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.57% in the annual population growth rate.

Table 4.108: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	151,586	1.0338	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	123,476	1.0279	0.9943	0.8133	30.10
	Upper mortality estimate	111,319	1.0250	0.9915	0.7354	21.24
Including Berwick Bank	Lower mortality estimate	120,931	1.0273	0.9937	0.7969	28.18
	Upper mortality estimate	108,346	1.0242	0.9907	0.7138	18.96

950. As for the PVAs detailed in **Section 4.4.8.2.5.2** and **Section 4.4.8.2.5.3** (see also **Section 4.4.1.2.5.2**) above, the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 26% for the upper mortality estimates whilst for the lower mortality estimates it reduced to 18% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.8.2.6 In-combination Conclusion

951. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the East Caithness Cliffs SPA kittiwake population is predicted to cause the population to be up to 26% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the East Caithness Cliffs SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

952. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the marked decline in the East Caithness Cliffs SPA kittiwake population, with the population currently below the citation level (**Table 4.99**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality but also in relation to each of the potential displacement mortality and collision mortality from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects when these effect pathways are considered separately.
953. Consequently, it is concluded that there is the potential for an adverse effect on the East Caithness Cliffs SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.8.3 Assessment for the Razorbill Population

954. The East Caithness Cliffs SPA razorbill population is currently estimated to number 40,373 breeding adults based upon the most recently available count data for the whole colony, which derive from 2015 - 2018 (Burnell et al. 2023). The SPA razorbill population has increased by more than 147% since the 1970s and by approximately 70% since 1999 (Swann, 2016, Burnell et al. 2023). Razorbill are listed as a feature of the SPA, with the current population well above the citation size of 15,800 individuals and considered to have a 'favourable maintained' condition status (**Table 4.99**).

4.4.8.3.1 The Potential for Impacts on the Razorbill Population

955. The Bellrock WFDA plus 2 km buffer does not overlap with the East Caithness Cliffs SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
956. At a distance of 238 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the East Caithness Cliffs SPA is beyond the mean maximum plus one standard deviation of the breeding season foraging range for razorbill, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). Consequently, there is deemed to be no breeding season connectivity with the Bellrock WFDA and, hence, no potential for breeding season impacts on the East Caithness Cliffs SPA razorbill population East Caithness Cliffs SPA.
957. In the non-breeding periods, razorbills tend to move to central areas of the North Sea during the mid-winter period (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the East Caithness Cliffs SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods, and potentially the winter period as well (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-

breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).

958. Given the above, the Bellrock WFDA may have potential effects on East Caithness Cliffs SPA razorbill population during non-breeding periods only.

4.4.8.3.2 Project Alone: Construction and Decommissioning

4.4.8.3.2.1 Disturbance

959. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the East Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.1**) except that, importantly, the East Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills and, consequently, only non-breeding period impacts are assessed. As outlined in **Section 4.4.2.3.2.1**, the potential for effects of construction-related disturbance on SPA razorbill populations is generally lower during the non-breeding periods than during the breeding season.
960. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the East Caithness Cliffs SPA razorbill population (and noting that there is no breeding season connectivity for the East Caithness Cliffs SPA razorbill population), it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.8.3.2.2 Displacement

961. The assessment of the potential effects of displacement during the construction and decommissioning phases on the East Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.2**) but noting, as in **Section 4.4.8.3.2.1** above, that the East Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
962. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the East Caithness Cliffs SPA razorbill population (and noting that there is no breeding season connectivity for the East Caithness Cliffs SPA razorbill population), it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.8.3.2.3 Changes to Prey Availability

963. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the East Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh razorbill population (**Section 4.4.2.3.2.3**) but noting, as in **Section 4.4.8.3.2.1** above, that the East Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).

964. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the East Caithness Cliffs SPA razorbill population (and noting that there is no breeding season connectivity for the East Caithness Cliffs SPA razorbill population), it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the East Caithness Cliffs SPA razorbill population.

4.4.8.3.3 *Project Alone: Operation and Maintenance*

4.4.8.3.3.1 Disturbance

965. The assessment of the potential effects of disturbance during the O&M phase on the East Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, but noting, as in **Section 4.4.8.3.2.1** above, that the East Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
966. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness et al. 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward et al. 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the East Caithness Cliffs SPA razorbill population.

4.4.8.3.3.2 Displacement/Barrier Effects

967. The potential effects of displacement and barrier effects during the O&M phase on the East Caithness Cliffs SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.109**). The resultant mortality estimates for the non-breeding periods were then apportioned to the East Caithness Cliffs SPA and to the adult and subadult age classes using the BDMPs approach, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.109** (Furness, 2015)

Table 4.109: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the East Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1,300	0.481	N/A	N/A	0.07
Autumn passage	0	N/A	0.04	0.03	N/A

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Winter	6	N/A	0.03	0.01	N/A
Spring passage	82	N/A	0.04	0.03	N/A

968. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the East Caithness Cliffs SPA razorbill population as a result of displacement is estimated to be 0.03 to 0.08 breeding adult birds and 0.02 to 0.05 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.110**). As detailed above (**Section 4.4.8.3.1**), all of the potential mortality from displacement is predicted to occur during the non-breeding periods because of the lack of connectivity during the breeding season.

Table 4.110: Potential Annual Mortality of East Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.025	0.017
	Annual total	-	-	0.025	0.017
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.003	0.001
	Spring passage	60%	3%	0.076	0.051
	Annual total	-	-	0.079	0.052

969. The additional annual mortality of adult razorbills from the East Caithness Cliffs SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0002% (upper estimate) of the current adult breeding population at this colony (i.e. 40,373 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e.

without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.002%.

970. Based upon the above, the potential levels of impact on the East Caithness Cliffs SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.8.3.3.3 Secondary Entanglement

971. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the East Caithness Cliffs SPA).
972. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the East Caithness Cliffs SPA razorbill population as a result of secondary entanglement.

4.4.8.3.3.4 Changes to Prey Availability

973. The assessment of the potential effects of changes to prey availability during the O&M phase on the East Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population but noting, as in **Section 4.4.8.3.2.1** above, that the East Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
974. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the East Caithness Cliffs SPA razorbill population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the East Caithness Cliffs SPA razorbill population.

4.4.8.3.4 Project Alone Conclusion

975. The potential effects from the Bellrock Wind Farm Infrastructure alone on the East Caithness Cliffs SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one twelfth of an adult bird and

only 0.0002% of the SPA population (with this population showing a long term increase), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the East Caithness Cliffs SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock Wind Farm Infrastructure, is presented below.

4.4.8.3.5 *Effects In-combination*

4.4.8.3.5.1 *Effects of Relevance to the In-combination Assessment*

976. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the East Caithness Cliffs SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

977. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the East Caithness Cliffs SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.8.3.5.2 *Displacement/Barrier Effects*

978. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the East Caithness Cliffs SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).

979. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.110**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm, whilst the estimated mortality from the Green Volt wind farm was excluded in all scenarios because the consent for this project is dependent on the provision of compensation to offset the predicted mortality from this project on the SPA razorbill population (**Table 1.1**, Marine Directorate, 2024).

980. Full details of the displacement mortality estimates for the East Caithness Cliffs SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.111**).

Table 4.111: Potential Annual Mortality of East Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	133.48	95.83
	Upper mortality estimate	274.20	189.87
Including Berwick Bank Wind Farm	Lower mortality estimate	138.80	99.39
	Upper mortality estimate	288.97	199.63
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

981. The potential mortality on the East Caithness Cliffs SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is between three to four orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 133 to 274 adult birds and 96 to 190 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 139 to 289 adults and 99 to 200 subadults (**Table 4.111**). All mortality was attributed to the non-breeding periods.
982. In terms of the additional annual mortality of adult birds, these estimates represent 0.3306% (lower estimate) to 0.6792% (upper estimate) of the current adult breeding population at this colony (i.e. 40,373 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.3438% (lower estimate) to 0.7158% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.10 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.149% to 6.468% (with the Berwick Bank Wind Farm effects excluded) and 3.274% to 6.817% (with the Berwick Bank Wind Farm effects included).

983. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.112: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the East Caithness Cliffs SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	124,935	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	111,211	1.0220	0.9970	0.8890	37.40
	Upper mortality estimate	98,429	1.0180	0.9930	0.7890	25.10
Including Berwick Bank	Lower mortality estimate	110,538	1.0220	0.9970	0.8860	36.70
	Upper mortality estimate	97,188	1.0180	0.9930	0.7780	24.10

984. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the East Caithness Cliffs SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). Based on the predicted impacts for this in-combination scenario, the CPS value for the upper mortality estimate indicates a reduction of 21% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.7% (**Table 4.112**). The metrics for the lower mortality estimates indicate reductions of 11% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.3% in the annual population growth rate.

985. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement

mortality to the East Caithness Cliffs SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 21% and 11% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.8.3.6 *In-combination Conclusion*

986. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the East Caithness Cliffs SPA razorbill population is predicted to cause the population to be up to 21% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the East Caithness Cliffs SPA razorbill) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.8.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one twelfth of an adult bird, representing only 0.0002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
987. Although the East Caithness Cliffs SPA razorbill population has been increasing for some years and is currently well above the citation level, with a 'favourable maintained' condition status (**Table 4.99**), it is considered that the scale of the potential reduction in population size (relative to that predicted in the absence of any wind farm effects) is sufficient to mean that the potential for an adverse effect due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded.
988. Consequently, it is concluded that there is the potential for an adverse effect on the East Caithness Cliffs SPA razorbill population as a result of the Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA razorbill populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.8.4 **Assessment for the Great Black-backed Gull Population**

989. At a distance of 238 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the East Caithness Cliffs SPA is beyond the mean maximum of the breeding

season foraging range for great black-backed gull, which is the metric used to determine breeding season connectivity for this species (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). As such, there is deemed to be no breeding season connectivity with the Bellrock WFDA and, hence, no potential for breeding season impacts on the East Caithness Cliffs SPA population.

990. It is also the case that the occurrence of great black-backed gulls on the OASA was limited to the non-breeding period (defined as September to March (NatureScot, 2020)), with records of the species being limited to just eight surveys during the baseline DAS programme (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**). The peak abundance estimate for the OASA was 77 individuals, as estimated in the December 2023 survey. The apportioning estimates for the East Caithness Cliffs SPA population for the non-breeding period are 0.0038 and 0.0048 for adult and subadult birds, respectively (Table 3.4 in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). Therefore, only 0.29 adult birds and 0.37 subadult birds from the SPA population are estimated occur on the Bellrock WFDA even when using the peak abundance estimate from across the entire OASA (which equates to the Bellrock WFDA plus four kilometre buffer).
991. Associated with the low abundance of this species in the baseline DAS, the potential collision mortality to this species was estimated as 1.14 birds per annum for the worst-case design (Table 3.2 in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)**).
992. Based on the sporadic occurrence and very low abundance of great black-backed gulls from the East Caithness Cliffs SPA on the Bellrock WFDA, it is concluded that any effects from the Bellrock Wind Farm Infrastructure alone on the SPA population will be, at most, small and highly localised. As such, there is no potential for an adverse effect on this SPA population as a result of the Wind Farm Infrastructure alone. Furthermore, it is considered that there is no potential for any effects to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects. Thus, there is also no potential for an adverse effect on this SPA population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.

4.4.8.5 Assessment for the Breeding Seabird Assemblage

993. The breeding seabird assemblage for the East Caithness Cliffs SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 300,000 seabirds). Kittiwake, razorbill and great black-backed gull comprise three of the eight species identified in the citation as having populations which are considered to be of European or national importance and which contribute to the East Caithness Cliffs SPA breeding seabird assemblage.
994. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock WFDA alone. However, for the SPA great black-backed gull population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-

combination with other plans and projects. For the SPA razorbill population, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects (noting that if the assessments for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects are undertaken the potential for an adverse effect is identified). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake, razorbill and great black-backed gull are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA process but, as stated above, the potential for an adverse effect is identified only in relation to kittiwake (and only as a result of the in-combination effects).

995. The East Caithness Cliffs SPA kittiwake population is currently estimated to number 18,300 AON. Given the size of this population and the scale of the potential impacts predicted, it is considered that there is no risk of the population being lost from the breeding seabird assemblage as a result of the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to kittiwake, it is concluded that the potential effects on this SPA population would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage. This conclusion remains unchanged if the potential in-combination effects on the SPA razorbill population are included. This is because there is considered to be no risk of this population being lost from the breeding seabird assemblage, given its current size (i.e. 40,373 breeding individuals), the fact that it has increased over the long term and the scale of the potential impacts predicted to arise.
996. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the East Caithness Cliffs SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.8.6 Site Conclusion

997. It is concluded that the possibility of an adverse effect cannot be excluded for the East Caithness Cliffs SPA population of breeding kittiwake, with the potential for an adverse effect arising from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA kittiwake population are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
998. Consequently, it is concluded that an Adverse Effect on Site Integrity of the East Caithness Cliffs SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.9 North Caithness Cliffs SPA

4.4.9.1 European Site Information and Conservation Objectives

999. North Caithness Cliffs SPA includes sea-cliff areas between Freswick Bay and Strathy Point on the north coast of the Scottish mainland, in addition to the island of Stroma. The site is located approximately 252 km from the Bellrock WFDA. The boundary of the SPA overlaps either partly or

wholly with Duncansby Head Site of SSSI, Stroma SSSI, Dunnet Head SSSI, Holborn Head SSSI, and Red Point Coast SSSI. The seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1996, with the marine extension classified in 2009.

1000. North Caithness Cliffs SPA qualifies under Article 4.1 by regularly supporting a population of European importance of one Annex I species (**Table 4.113**). North Caithness Cliffs SPA also qualifies under Article 4.2 by regularly supporting a population of European importance of one migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including four species named only as component species (**Table 4.113**). The potential for LSE has been identified in relation to three of the six qualifying species (**Table 4.113**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1001. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1002. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1003. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.113: Details on the Qualifying Features of the North Caithness Cliffs SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	110,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable, no change	13,100 pairs	Yes
Guillemot	Breeding	Favourable maintained	38,300 individuals	No
Razorbill ¹	Breeding	Favourable maintained	4,000 individuals	Yes
Puffin ¹	Breeding	Unfavourable declining	2,080 pairs	Yes
Fulmar ¹	Breeding	Favourable maintained	14,700 pairs	No
Peregrine	Breeding	Unfavourable declining	6 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.9.2 Assessment for the Kittiwake Population

1004. The North Caithness Cliffs SPA kittiwake population is currently estimated to number 9,029 AONs (which is taken to equate to 18,058 breeding adults), based upon the most recently available count data from 2023-2024 (JNCC and BTO, 2025). The SPA population was estimated to number 10,147 AONs of birds between 1998 and 2002 but had declined to 5,571 AONs by 2015 - 2016 when the counts of this SPA population were undertaken for the Seabirds Count census (Burnell et al. 2023, JNCC and BTO, 2025). The most recent estimate means that the size of the SPA population remains below the citation level of 13,100 pairs but suggests a degree of recovery since 2015 - 2016 (**Table 4.113**).

4.4.9.2.1 The Potential for Impacts on the Kittiwake Population

1005. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *maintain and restore the qualifying features to ensure they are viable components of the SPA*.
1006. At a distance of 252 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the North Caithness Cliffs SPA is within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by North Caithness Cliffs SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately

70% or more of the at-sea population of kittiwakes from the North Caithness Cliffs SPA at any given time (Cleasby et al. 2018).

1007. The apportioning calculations estimate that approximately 1% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by North Caithness Cliffs SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the North Caithness Cliffs SPA is somewhat lower than the estimated 1%.
1008. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the North Caithness Cliffs SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
1009. Given the above, the Bellrock WFDA may have potential effects on North Caithness Cliffs SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.9.2.2 Project Alone: Construction and Decommissioning

4.4.9.2.2.1 Disturbance

1010. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the North Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the North Caithness Cliffs SPA (Cleasby et al. 2018).
1011. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the North Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.9.2.2.2 Displacement

1012. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the North Caithness Cliffs SPA (Cleasby et al. 2018).

1013. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the North Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.9.2.2.3 Changes to Prey Availability

1014. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the North Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the North Caithness Cliffs SPA (Cleasby et al. 2018).
1015. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the North Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the North Caithness Cliffs SPA kittiwake population.

4.4.9.2.3 Project Alone: Operation and Maintenance

4.4.9.2.3.1 Disturbance

1016. The assessment of the potential effects of disturbance during the O&M phase on the North Caithness Cliffs SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the North Caithness Cliffs SPA (Cleasby et al. 2018).
1017. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the North Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the North Caithness Cliffs SPA kittiwake population.

4.4.9.2.3.2 Displacement/Barrier Effects

1018. The potential effects of displacement and barrier effects during the O&M phase on the North Caithness Cliffs SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology**

Displacement Assessment Report (Volume IV) and Table 4.114). The resultant seasonal mortality estimates were then apportioned to the North Caithness Cliffs SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.114**.

Table 4.114: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.013	0.013	0.1
Autumn passage	94	N/A	0.015	0.009	N/A
Spring passage	84	N/A	0.019	0.009	N/A

1019.

Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the North Caithness Cliffs SPA kittiwake population as a result of displacement is estimated to be 0.02 to 0.06 breeding adult birds and 0.01 to 0.02 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.115**). Over 42% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.115: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.010	0.001
	Autumn passage	30%	1%	0.004	0.003
	Spring passage	30%	1%	0.006	0.003
	Annual total	-	-	0.020	0.006
Upper mortality estimate	Breeding	30%	3%	0.031	0.002
	Autumn passage	30%	3%	0.012	0.007
	Spring passage	30%	3%	0.016	0.007
	Annual total	-	-	0.058	0.016

1020. The additional annual mortality of adult kittiwakes from the North Caithness Cliffs SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0003% (upper estimate) of the current adult breeding population at this colony (i.e. 18,058 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.002%.
1021. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.9.2.3.3 Collision Risk

1022. The collision estimates for the North Caithness Cliffs SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the North Caithness Cliffs SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1023. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.25 adult and 0.07 subadult birds (**Table 4.116**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0014% of the current adult breeding population at this colony (i.e. 18,058 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.008%.

Table 4.116: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the North Caithness Cliffs SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.130	0.009
Autumn passage	0.063	0.037
Spring passage	0.056	0.025
Annual total	0.248	0.070

1024. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.9.2.3.4 Combined Collisions and Displacement/Barrier Effects

1025. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.27 and 0.31 adult and 0.08 and 0.09 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0015% to 0.0017% of the current adult breeding population at this colony (i.e. 18,058 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.010% and 0.012%.
1026. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.9.2.3.5 Changes to Prey Availability

1027. The assessment of the potential effects of changes to prey availability during the O&M phase on the North Caithness Cliffs kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of

the Bellrock WFDA during the breeding season by kittiwake from the North Caithness Cliffs SPA (Cleasby et al. 2018).

1028. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the North Caithness Cliffs SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the North Caithness Cliffs SPA kittiwake population.

4.4.9.2.4 Project Alone Conclusion

1029. The potential effects from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents less than one third of an adult bird and only 0.002% of the SPA population (with this population having shown indications of recent, limited, recovery following a previous decline), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the North Caithness Cliffs SPA kittiwake population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.9.2.5 Effects In-combination

4.4.9.2.5.1 Effects of Relevance to the In-combination Assessment

1030. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1031. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the North Caithness Cliffs SPA kittiwake population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.9.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1032. As described in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV), estimates of the displacement mortality attributed to the North Caithness Cliffs SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in Section 4.4.1.2.5.2). This was as agreed by NatureScot (**Table 1.1**).

1033. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.115**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm
1034. Full details of the displacement mortality estimates for the North Caithness Cliffs SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.117**).

Table 4.117: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	11.86	4.63
	Upper mortality estimate	13.15	5.27
Including Berwick Bank Wind Farm	Lower mortality estimate	30.37	13.88
	Upper mortality estimate	34.25	15.81
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1035. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 12 to 13 breeding adult birds and five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 30 to 34 adults and 14 to 16 subadults (**Table 4.117**).
1036. In terms of the additional annual mortality of adult birds, these estimates represent 0.0657% (lower estimate) to 0.1682% (upper estimate) of the current adult breeding population at this colony (i.e. 18,058 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0728% (lower estimate) to 0.1989% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population**

Viability Technical Report (Volume IV)), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.450% to 1.152% (with the Berwick Bank Wind Farm effects excluded) and 0.499% to 1.299% (with the Berwick Bank Wind Farm effects included).

1037. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.118: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50th Centile
Baseline (no impact)	N/A	74,963	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	73,228	1.0332	0.9995	0.9804	47.92
	Upper mortality estimate	71,136	1.0323	0.9986	0.9497	44.98
Including Berwick Bank	Lower mortality estimate	73,106	1.0332	0.9994	0.9781	47.70
	Upper mortality estimate	70,527	1.0321	0.9984	0.9430	44.08

1038. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the North Caithness Cliffs SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper

mortality estimate indicating a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.14% (**Table 4.118**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.05% in the annual population growth rate.

1039. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the North Caithness Cliffs SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% and 2% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1040. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.9.2.5.3 Collision Risk – Operation and Maintenance

1041. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the North Caithness Cliffs SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1042. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1043. Full details of the collision estimates for the North Caithness Cliffs SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.119**).

Table 4.119: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	37.00	18.01
Including Berwick Bank Wind Farm	41.56	20.31

1044. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality ranges from 37 to 42 breeding adult birds and 18 to 20 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.119**).
1045. In terms of the additional annual mortality of adult birds, these estimates represent 0.2049% (Berwick Bank excluded) to 0.2301% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 18,058 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.403% (Berwick Bank excluded) to 1.576% (Berwick Bank included).
1046. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.120: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	74,963	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	70,284	1.0319	0.9982	0.9377	43.70
Including Berwick Bank	69,651	1.0317	0.9980	0.9304	42.64

1047. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the North Caithness Cliffs SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 6% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.18% (**Table 4.120**).
1048. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.9.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, with the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remaining at a 6% reduction in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (**Table 3.2 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1049. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.9.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1050. The potential mortality attributed to the North Caithness Cliffs SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.121**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.9.2.5.2** and **Section 4.4.9.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.121: Potential Annual Mortality of North Caithness Cliffs SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	48.86	22.64
	Upper mortality estimate	67.37	31.89
Including Berwick Bank Wind Farm	Lower mortality estimate	54.71	25.58
	Upper mortality estimate	75.80	36.12
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.117 and Table 4.119 due to rounding errors.			

1051. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 49 to 67 breeding adult birds and 23 to 32 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 55 to 76 adults and 26 to 36 subadults. These estimates represent 0.2706% (lower estimate) to 0.3731% (upper estimate) of the current adult breeding population at this colony (i.e. 18,058 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.3029% (lower estimate) to 0.4198% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.853% to 2.555% (with the Berwick Bank Wind Farm effects excluded) and 2.075% to 2.875% (with the Berwick Bank Wind Farm effects included).
1052. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.122** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 11% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm

effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.32% (**Table 4.122**). The metrics for the lower mortality estimates indicate reductions of 8% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.23% in the annual population growth rate.

Table 4.122: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	74,963	1.0337	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	68,850	1.0314	0.9977	0.9195	41.46
	Upper mortality estimate	66,684	1.0305	0.9968	0.8910	38.52
Including Berwick Bank	Lower mortality estimate	68,085	1.0311	0.9974	0.9106	40.36
	Upper mortality estimate	65,659	1.0300	0.9964	0.8776	37.18

1053. As for the PVAs detailed in **Section 4.4.9.2.5.2** and **Section 4.4.9.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 11% and 8% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.9.2.6 In-combination Conclusion

1054. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the North Caithness Cliffs SPA kittiwake population is predicted to cause the population to be up to 11% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the North Caithness Cliffs SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated

that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.9.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (less than one third of an adult bird, representing only 0.002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1055. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the North Caithness Cliffs SPA kittiwake population remaining below its citation level and its 'unfavourable, no change' condition status (**Table 4.113**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
1056. Consequently, it is concluded that there is the potential for an adverse effect on the North Caithness Cliffs kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.9.3 Assessment for the Razorbill Population

1057. The North Caithness Cliffs SPA razorbill population is currently estimated to number 4,796 individuals, based on counts from 2015-2016, which represents the most recent survey of the entire SPA (Burnell et al. 2023). Subsequent counts at this SPA in 2023 and 2024, which covered most but not all count sectors, suggest that the population has grown considerably since 2015-2016 (JNCC and BTO, 2025). The population estimate from 2015-2016 represents a 41% increase from that estimated during the Seabird 2000 census (Burnell et al. 2023). Razorbills are listed on the North Caithness Cliffs SPA citation as a named component of the breeding seabird assemblage, with a citation population size of 4,000 individuals (**Table 4.113**). Thus, the numbers currently breeding on North Caithness Cliffs exceed the citation level for this site while the population is considered to have a 'favourable maintained' condition status (**Table 4.113**).
1058. The Seabirds Count estimate from 2015-2016 is used for the current assessment, on the basis that it derives from the most recent full survey of the SPA

4.4.9.3.1 The Potential for Impacts on the Razorbill Population

1059. The Bellrock WFDA plus 2 km buffer does not overlap with the North Caithness Cliffs SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.

1060. At a distance of 252 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the North Caithness Cliffs SPA is not within the mean maximum plus one standard deviation of the breeding season foraging range for razorbill, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). Consequently, there are deemed to be no breeding season impacts on the razorbill population from the North Caithness Cliffs SPA.
1061. In the non-breeding periods, razorbills tend to move to central areas of the North Sea towards Scandinavia (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the North Caithness Cliffs SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods when travelling to and from their wintering areas (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1062. Given the above, the Bellrock WFDA may have potential effects on North Caithness Cliffs SPA razorbill population during non-breeding periods only.

4.4.9.3.2 Project Alone: Construction and Decommissioning

4.4.9.3.2.1 Disturbance

1063. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the North Caithness Cliffs SPA razorbill population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed.
1064. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the North Caithness Cliffs SPA razorbill population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.9.3.2.2 Displacement

1065. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Caithness Cliffs SPA razorbill population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1066. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the North Caithness Cliffs SPA razorbill population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.9.3.2.3 Changes to Prey Availability

1067. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the North Caithness Cliffs SPA razorbill population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the North Caithness Cliffs SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1068. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the North Caithness Cliffs SPA razorbill population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the North Caithness Cliffs SPA razorbill population.

4.4.9.3.3 *Project Alone: Operation and Maintenance*

4.4.9.3.3.1 Disturbance

1069. The assessment of the potential effects of disturbance during the O&M phase on the North Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, except that the North Caithness Cliffs SPA razorbill population is only being assessed in the non-breeding periods.
1070. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness *et al.* 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward *et al.* 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the North Caithness Cliffs SPA razorbill population.

4.4.9.3.3.2 Displacement/Barrier Effects

1071. The potential effects of displacement and barrier effects during the O&M phase on the North Caithness Cliffs SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.123**). The resultant seasonal mortality estimates were then apportioned to the North Caithness Cliffs SPA and to the adult and subadult age classes, for non-breeding periods only, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.123**.

Table 4.123: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	0	0	0.07
Autumn passage	0	N/A	0.005	0.004	N/A
Winter	6	N/A	0.005	0.001	N/A
Spring passage	82	N/A	0.005	0.004	N/A

1072. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the North Caithness Cliffs SPA razorbill population as a result of displacement is estimated to be 0.00 to 0.01 breeding adult birds and 0.00 to 0.01 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.124**). As detailed above, 100% of the potential mortality from displacement is predicted to occur during the non-breeding periods.

Table 4.124: Potential Annual Mortality of North Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.0000	0.0000
	Autumn passage	60%	1%	0.0000	0.0000
	Winter	60%	1%	0.0000	0.0000
	Spring passage	60%	1%	0.0033	0.0023
	Annual total	-	-	0.0033	0.0023
Upper mortality estimate	Breeding	60%	5%	0.0000	0.0000
	Autumn passage	60%	3%	0.0000	0.0000
	Winter	60%	3%	0.0005	0.0001
	Spring passage	60%	3%	0.0098	0.0070
	Annual total	-	-	0.0103	0.0071

1073. The additional annual mortality of adult razorbills from the North Caithness Cliffs SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0002% (upper estimate) of the current adult breeding population at this colony (i.e. 4,796 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.002%.
1074. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.9.3.3.3 Secondary Entanglement

1075. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the North Caithness Cliffs SPA).
1076. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the North Caithness Cliffs SPA razorbill population as a result of secondary entanglement.

4.4.9.3.3.4 Changes to Prey Availability

1077. The assessment of the potential effects of changes to prey availability during the O&M phase on the North Caithness Cliffs SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population but noting, that the North Caithness Cliffs SPA is beyond the distance for breeding season connectivity of razorbills. Consequently, the potential for effects is limited to the non-breeding periods (when this potential is generally lower than during the breeding season).
1078. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the North Caithness Cliffs SPA razorbill population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the North Caithness Cliffs SPA razorbill population.

4.4.9.3.4 *Project Alone Conclusion*

1079. The potential effects from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one hundredth of an adult bird and only 0.0002% of the SPA population (with this population having an increasing trend), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the North Caithness Cliffs SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock Wind Farm Infrastructure, is presented below.

4.4.9.3.5 *Effects In-combination*

4.4.9.3.5.1 *Effects of Relevance to the In-combination Assessment*

1080. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1081. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the North Caithness Cliffs SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.9.3.5.2 *Displacement/Barrier Effects*

1082. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the North Caithness Cliffs SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
1083. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.124**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).

1084. Full details of the displacement mortality estimates for the North Caithness Cliffs SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.125**).

Table 4.125: Potential Annual Mortality of North Caithness Cliffs SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	9.53	5.93
	Upper mortality estimate	21.79	13.99
Including Berwick Bank Wind Farm	Lower mortality estimate	10.11	6.32
	Upper mortality estimate	23.51	15.16
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

1085. The potential mortality on the North Caithness Cliffs SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects approximately three orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 10 to 22 adult birds and six to 14 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 10 to 24 adults and six to 15 subadults (**Table 4.125**). All mortality was attributed to the non-breeding periods.
1086. In terms of the additional annual mortality of adult birds, these estimates represent 0.1988% (lower estimate) to 0.4542% (upper estimate) of the current adult breeding population at this colony (i.e. 4,796 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.2107% (lower estimate) to 0.4901% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot,

2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.893% to 4.326% (with the Berwick Bank Wind Farm effects excluded) and 2.007% to 4.668% (with the Berwick Bank Wind Farm effects included).

1087. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.126: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	14,820	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	13,840	1.0230	0.9980	0.9340	42.30
	Upper mortality estimate	12,721	1.0210	0.9960	0.8570	33.50
Including Berwick Bank	Lower mortality estimate	13,830	1.0230	0.9980	0.9310	42.20
	Upper mortality estimate	12,514	1.0200	0.9950	0.8460	32.20

1088. No adverse effect on the North Caithness Cliffs SPA razorbill population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 15% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.5% (**Table 4.126**). The metrics for the lower mortality estimates indicate reductions of 7% in the size of the SPA population after 35 years

(relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.2% in the annual population growth rate.

1089. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the North Caithness Cliffs SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) was at 15% and 7% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.9.3.6 *In-combination Conclusion*

1090. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the North Caithness Cliffs SPA razorbill population is predicted to cause the population to be up to 15% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the North Caithness Cliffs SPA razorbill population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the North Caithness Cliffs SPA razorbill population (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.9.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one hundredth of an adult bird, representing only 0.0002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1091. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has shown a considerable increase in numbers between the period 2015 – 2016 and 2023 – 2024, and is currently above the citation level and has a ‘favourable maintained’ condition status (**Table 4.113**). Given this, it is concluded that there is no potential for an adverse effect on the North Caithness Cliffs SPA razorbill population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
1092. It is important to consider that this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA razorbill populations, which have been outlined in **Section 4.2.2**.

4.4.9.4 **Assessment for the Puffin Population**

1093. The North Caithness Cliffs SPA puffin population is currently estimated to number 3,039 AOBs (which is taken to equate to 6,078 breeding adults), based upon the most recently available count data for the whole colony which derive from the Seabirds Count census, undertaken from 2015 to

2021 (Burnell et al. 2023). This represents a 56% decline from the 6,958 AOBs estimated for the period 1998 – 2002 during the Seabird 2000 census. Despite this decline, the most recent estimate of the SPA population size remains above the citation level of 2,080 pairs (**Table 4.113**).

4.4.9.4.1 *The Potential for Impacts on the Puffin Population*

1094. The Bellrock WFDA plus 2 km buffer does not overlap with the North Caithness Cliffs SPA, so that potential impacts on its puffin population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain and restore the qualifying features to ensure they are viable components of the SPA*'.
1095. At a distance of 252 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Farne Islands SPA is just within the mean maximum plus one standard deviation of the breeding season foraging range for puffin, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (62.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by North Caithness Cliffs SPA puffins during the breeding season is likely to be low, despite the potential for connectivity.
1096. The apportioning calculations estimate that <1% of the puffins occurring on the Bellrock WFDA during the breeding season derive from this SPA colony, although only 46% of these birds are assumed to be breeding adults (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The breeding season for puffin is defined as April to mid-August, following the NatureScot (2020b) guidance.
1097. After the breeding season puffins tend to migrate rapidly from their UK breeding areas, leaving the seas immediately adjacent to their colonies by late August and dispersing widely across northwest European seas and the Atlantic (Wernham et al. 2002, Harris and Wanless, 2011, Stone et al. 1995, Jessopp et al. 2013). There was no evidence of a peak in puffin abundance during the post-breeding dispersal period at the Bellrock WFDA and, in accordance with NatureScot advice (**Table 1.1**), no quantitative assessment of impacts during the non-breeding period is undertaken for the North Caithness Cliffs SPA puffin (although qualitative consideration of potential non-breeding period impacts is included within the conclusions for the Bellrock Wind Farm Infrastructure alone – see **Section 4.4.9.4.4**).

4.4.9.4.2 *Project Alone: Construction and Decommissioning*

4.4.9.4.2.1 *Disturbance*

1098. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the North Caithness Cliffs SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
1099. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the North Caithness Cliffs SPA puffin population are presented in **Section 4.4.4.3.2.1**. On the basis of these details as applied to the North Caithness Cliffs SPA

puffin population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the North Caithness Cliffs SPA puffin population.

4.4.9.4.2.2 Displacement

1100. As detailed in **Section 4.4.4.3.2.1**, puffin is considered to have a low sensitivity to disturbance, whilst potential effects of disturbance during the construction and decommissioning phases will only extend across a small part of the wider foraging areas used by the North Caithness Cliffs SPA puffin population and be limited to, at most, a seven year period during construction (and a likely similar or shorter period during decommissioning). Furthermore, as detailed above, potential effects of disturbance will not occur simultaneously across the entirety of the Bellrock WFDA but, rather, will be carried out in different areas at different times. Thus, at any given time the potential for disturbance effects that could lead to displacement of puffins from this SPA will be limited to relatively small areas, with the potential effects also being of a temporary nature.
1101. Therefore, based upon the above, it is considered that there is relatively little potential for the North Caithness Cliffs SPA puffin population to be affected by displacement during the construction or decommissioning phases, with any such effects only extending across relatively small areas and tending to be temporary in nature. Consequently, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the North Caithness Cliffs SPA puffin population.

4.4.9.4.2.3 Changes to Prey Availability

1102. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the North Caithness Cliffs SPA puffin population is essentially as for the Farne Islands SPA puffin population. It should be noted that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
1103. On the basis of the details of the assessment of the potential effects of changes in prey availability on the Farne Islands SPA puffin population (**Section 4.4.4.3.2.3**), it is considered that there is little potential for the North Caithness Cliffs SPA puffin population to be affected by changes to prey availability during the construction and decommissioning phases. Consequently, it is considered that there is no potential for construction or decommissioning related changes in prey availability to lead to an adverse effect on the North Caithness Cliffs SPA puffin population.

4.4.9.4.3 *Project Alone: Operation and Maintenance*

4.4.9.4.3.1 Disturbance

1104. The assessment of the potential effects of disturbance during the O&M phase on the North Caithness Cliffs SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
1105. The details of the assessment of the potential effects of disturbance during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.3.1**. On the basis of these details as applied to the North Caithness Cliffs SPA puffin population, it is considered that there is no potential for O&M related disturbance to lead to an adverse effect on the North Caithness Cliffs SPA puffin population.

4.4.9.4.3.2 Displacement/Barrier Effects

1106. The potential effects of displacement and barrier effects during the O&M phase on the North Caithness Cliffs SPA puffin population were assessed using the approach and methods outlined for the Farne Island SPA puffin population in **Section 4.4.4.3.3.2**. Thus, the displacement and mortality rates advised for puffin by NatureScot (2023d) were applied to the mean peak population sizes of puffin within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.127**). The resultant seasonal mortality estimates were then apportioned to the North Caithness Cliffs SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.127**.

Table 4.127: Puffin Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer During the Breeding Season, with the North Caithness Cliffs SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	360	0.463	0.004	0.004	0.07

1107. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the North Caithness Cliffs SPA puffin population as a result of displacement is estimated to be 0.01 to 0.02 breeding adult birds and 0.01 to 0.02 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.128**).

Table 4.128: Potential Annual Mortality of North Caithness Cliffs SPA Puffins due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.010	0.013
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	0.010	0.013
Upper mortality estimate	Breeding	60%	5%	0.017	0.021
	Non-breeding	N/A	N/A	N/A	N/A
	Annual total	-	-	0.017	0.021

1108. The additional annual mortality of adult puffins from the North Caithness Cliffs SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0003% (upper estimate) of the current adult breeding population at this colony (i.e. 6,078 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.1– see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.003%.
1109. Based upon the above, the potential levels of impact on the North Caithness Cliffs SPA puffin population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.9.4.3.3 Changes to Prey Availability

1110. The assessment of the potential effects of changes to prey availability during the O&M phases on the North Caithness Cliffs SPA puffin population is essentially as for the Farne Islands SPA puffin population, noting that the North Caithness Cliffs SPA is further from the Bellrock WFDA than is the Farne Islands SPA.
1111. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Farne Islands SPA puffin population are presented in **Section 4.4.4.3.2.3**. On the basis of these details as applied to the North Caithness Cliffs SPA puffin population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the North Caithness Cliffs SPA puffin population.

4.4.9.4.3.4 Secondary Entanglement

1112. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including puffins from the North Caithness Cliffs SPA).
1113. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the North Caithness Cliffs SPA puffin population as a result of secondary entanglement.

4.4.9.4.4 *Project Alone Conclusion*

1114. The potential effects, as considered in **Section 4.4.9.4.2.1** to **Section 4.4.9.4.3.4** above, from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA puffin population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. As outlined in **Section 4.4.9.4.1**, the assessment for the SPA population focusses on breeding season effects, in accordance with NatureScot advice (**Table 1.1**). This is because puffins migrate rapidly from their UK breeding areas, dispersing widely across northwest European seas and the Atlantic, so that puffins occurring within the Bellrock WFDA and 2 km buffer during the non-breeding period are unlikely to derive from North Caithness Cliffs SPA population. This, together with the low numbers of puffins recorded during the non-breeding period in the baseline DAS (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**), means that effects on the SPA population from the Bellrock Wind Farm Infrastructure alone during the non-breeding period are highly unlikely.
1115. Based upon the above considerations, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on the North Caithness Cliffs SPA puffin population. Furthermore, given that the scale of the potential additional mortality represents one fiftieth of an adult bird and only 0.0003% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the North Caithness Cliffs SPA puffin population, which incorporates the potential mortality predicted from the Bellrock Wind Farm Infrastructure, is presented below.

4.4.9.4.5 *Effects In-combination*

4.4.9.4.5.1 *Effects of Relevance to the In-combination Assessment*

1116. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the North Caithness Cliffs SPA puffin population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1117. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the North Caithness Cliffs SPA puffin population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.9.4.5.2 *Displacement/Barrier Effects*

1118. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the North Caithness Cliffs SPA puffin population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).

1119. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.128**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1120. Full details of the displacement mortality estimates for the North Caithness Cliffs SPA puffin population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.129**).

Table 4.129: Potential Annual Mortality of North Caithness Cliffs SPA Puffin due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	33.18	32.15
	Upper mortality estimate	54.11	53.58
Including Berwick Bank Wind Farm	Lower mortality estimate	33.24	32.21
	Upper mortality estimate	54.21	53.68
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%, respectively.			

1121. The potential mortality on the North Caithness Cliffs SPA puffin population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from almost 33 to 54 breeding adult birds and 32 to 54 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 33 to 54 adults and 32 to 54 subadults (**Table 4.129**).
1122. In terms of the additional annual mortality of adult birds, these estimates represent 0.5460% (lower estimate) to 0.8902% (upper estimate) of the current adult breeding population at this colony (i.e. 6,078 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.5470% (lower estimate) to 0.8918% (upper estimate) of the current adult breeding population with the Berwick

Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.1 – see Table 2.11 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 5.460% to 8.902% (with the Berwick Bank Wind Farm effects excluded) and 5.470% to 8.918% (with the Berwick Bank Wind Farm effects included).

1123. The PVA methodology and descriptions of outputs are as detailed in **Section 4.4.1.2.5.2**. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.130: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Caithness Cliffs SPA Puffin Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	20,791	1.0251	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	16,833	1.0192	0.9942	0.8105	31.70
	Upper mortality estimate	14,714	1.0154	0.9905	0.7080	21.66
Including Berwick Bank	Lower mortality estimate	16,792	1.0192	0.9942	0.8095	31.36
	Upper mortality estimate	14,653	1.0154	0.9904	0.7071	21.40

1124. No adverse effect on the North Caithness Cliffs SPA puffin population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 29% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the

associated reduction in annual population growth rate (as determined from the CPGR value) is 0.96% (**Table 4.130**). The metrics for the lower mortality estimates indicate reductions of 19% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.58% in the annual population growth rate.

1125. In addition to projecting the PVAs over a 35 year period, 50 year projections were also undertaken in which the wind farm effects were incorporated for the first 35 years followed by a 15 year recovery period without any wind farm effects. In terms of the CPS and CPGR metrics, these 50 year projections gave very similar outputs to the 35 year projections for the displacement effects on the SPA puffin population. Thus, there were very small decreases in the predicted level of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 29% and 19% for the upper and lower displacement mortality estimates, respectively (Table 3.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.9.4.6 *In-combination Conclusion*

1126. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the North Caithness Cliffs SPA puffin population is predicted to cause the population to be up to 29% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the North Caithness Cliffs SPA puffin population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the North Caithness Cliffs SPA puffin population (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.9.4.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one fiftieth of an adult bird, representing only 0.0003% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1127. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects in the context of a population which appears to have undergone a marked decline in the last 20 years or so, is currently of relatively small size and which has an 'unfavourable declining' condition status (**Table 4.113**), it is concluded that the possibility of adverse effect cannot be excluded.
1128. Consequently, it is concluded that there is the potential for an adverse effect on the North Caithness Cliffs SPA puffin population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA puffin populations.

4.4.9.5 Assessment for the Breeding Seabird Assemblage

1129. The breeding seabird assemblage for the North Caithness Cliffs SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 110,000 individual breeding seabirds). Kittiwake, razorbill and puffin are amongst the five species identified in the citation as having nationally important populations which contribute to the North Caithness Cliffs SPA breeding seabird assemblage.
1130. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to all three species, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects, noting that if the assessments for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects are undertaken, the potential for an adverse effect is identified for the SPA kittiwake and SPA puffin populations but not for the SPA razorbill population. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake, razorbill and puffin are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, no potential for an adverse effect is identified for any of them.
1131. Given the above, it is concluded that there is no potential for an adverse effect on the SPA seabird assemblage in relation to the Bellrock WFDA alone or in-combination with other plans and projects. This conclusion would change if the in-combination impacts on either (or both) of the SPA kittiwake or SPA puffin populations were considered to represent a potential adverse effect. The North Caithness Coast SPA kittiwake population is currently estimated to number 9,029 AON, whilst the SPA puffin population is estimated to number 3,039 AOB. It is considered that the scale of the potential in-combination impacts, in conjunction with the small size of these populations (particularly puffin) and their 'unfavourable' condition status, is sufficient to represent an increased risk that they could lost from the breeding seabird assemblage. However, as stated above in relation to both of these SPA populations, it is considered that the effects from the Bellrock Wind Farm Infrastructure alone represent no meaningful addition to the in-combination effects from the other plans and projects.

4.4.9.6 Site Conclusion

1132. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the North Caithness Cliffs SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the North Caithness Cliffs SPA.

4.4.10 Copinsay SPA

4.4.10.1 European Site Information and Conservation Objectives

1133. The Copinsay SPA comprises a group of islands approximately 2 km off the east coast of Orkney Mainland, approximately 264 km from the Bellrock WFDA. The islands have a cliffed rocky

coastline and maritime vegetation that support large colonies of breeding seabirds. The boundary of the SPA encompasses Copinsay SSSI, and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1994, with the marine extension classified in 2009.

1134. Copinsay SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including four species named as component species (**Table 4.131**). The potential for LSE has been identified in relation to two of the four qualifying species (**Table 4.131**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1135. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1136. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.131: Details on the Qualifying Features of the Copinsay SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable, no change	70,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	9,550 pairs	Yes
Great black-backed gull ¹	Breeding	Unfavourable declining	490 pairs	Yes
Guillemot ¹	Breeding	Unfavourable declining	29,450 individuals	No
Fulmar ¹	Breeding	Favourable maintained	1,615 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.10.2 Assessment for the Kittiwake Population

1137. The Copinsay SPA kittiwake population is currently estimated to number 955 AONs (which is taken to equate to 1,910 breeding adults), based upon the most recently available count data for the entire colony which derive from 2015 – 2021 Seabirds Count census (Burnell et al. 2023). This represents a 78% decline from the 4,256 AONs estimated for the period 1998 – 2002 during the Seabird 2000 census. This further decline from previous levels reflected in the Seabirds Count estimate means that the SPA population is now substantially below the citation level of 9,550 breeding pairs (**Table 4.131**).

4.4.10.2.1 The Potential for Impacts on the Kittiwake Population

1138. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *maintain and restore the qualifying features to ensure they are viable components of the SPA*.
1139. At a distance of 264 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Copinsay SPA is within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Copinsay SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Copinsay SPA at any given time (Wakefield et al. 2017, Cleasby et al. 2018). Additionally, tracking of 19 breeding kittiwakes from the Copinsay SPA in between 2010 and 2014 demonstrated no usage of the Bellrock WFDA, which was well beyond the 64 km mean maximum foraging range of the tracked birds (Wakefield et al. 2017).
1140. The apportioning calculations estimate that approximately 0.2% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Copinsay SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Copinsay SPA is somewhat lower than the estimated 0.2%.
1141. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Copinsay SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
1142. Given the above, the Bellrock WFDA may have potential effects on Copinsay SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding

season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.10.2.2 Project Alone: Construction and Decommissioning

4.4.10.2.2.1 Disturbance

1143. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Copinsay SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Copinsay SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Copinsay SPA (Wakefield et al. 2017, Cleasby et al. 2018,).
1144. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Copinsay SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.10.2.2.2 Displacement

1145. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Copinsay SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Copinsay SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Copinsay SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1146. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Copinsay SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.10.2.2.3 Changes to Prey Availability

1147. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Copinsay SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Copinsay SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Copinsay SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1148. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the

Copinsay SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Copinsay SPA kittiwake population.

4.4.10.2.3 *Project Alone: Operation and Maintenance*

4.4.10.2.3.1 Disturbance

1149. The assessment of the potential effects of disturbance during the O&M phase on the Copinsay SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Copinsay SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Copinsay SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1150. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Copinsay SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Copinsay SPA kittiwake population.

4.4.10.2.3.2 Displacement/Barrier Effects

1151. The potential effects of displacement and barrier effects during the O&M phase on the Copinsay SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.132**). The resultant seasonal mortality estimates were then apportioned to the Copinsay SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.132**.

Table 4.132: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Copinsay SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.002	0.002	0.1
Autumn passage	94	N/A	0.001	0.001	N/A
Spring passage	84	N/A	0.001	0.001	N/A

1152. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Copinsay SPA kittiwake population as a result of displacement is estimated to be 0.002 to 0.007 breeding adult birds and 0 to 0.001 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.133**). Over 62% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.133: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.0015	0.0001
	Autumn passage	30%	1%	0.0003	0.0002
	Spring passage	30%	1%	0.0004	0.0002
	Annual total	-	-	0.0022	0.0004
Upper mortality estimate	Breeding	30%	3%	0.0048	0.0003
	Autumn passage	30%	3%	0.0008	0.0005
	Spring passage	30%	3%	0.0010	0.0004
	Annual total	-	-	0.0065	0.0012

1153. The additional annual mortality of adult kittiwakes from the Copinsay SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0003% (upper estimate) of the current adult breeding population at this colony (i.e. 1,910 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.002%.
1154. Based upon the above, the potential levels of impact on the Copinsay SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.10.2.3.3 Collision Risk

1155. The collision estimates for the Copinsay SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Copinsay SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1156. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.03 adult and 0.01 subadult birds (**Table 4.134**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0014% of the current adult breeding population at this colony (i.e. 1,910 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.001%.

Table 4.134: Predicted Collision Effects from the Worst-Case Design for the Bellrock WFDA on the Copinsay SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.020	0.001
Autumn passage	0.004	0.002
Spring passage	0.004	0.002
Annual total	0.028	0.005

1157. Based upon the above, the potential levels of impact on the Copinsay SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.10.2.3.4 Combined Collisions and Displacement/Barrier Effects

1158. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of 0.03 adult and 0.01 subadult birds, irrespective of whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents approximately 0.0017% of the current adult breeding population at this colony (i.e. 1,910 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of 0.012%.
1159. Based upon the above, the potential levels of impact on the Copinsay SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.10.2.3.5 Changes to Prey Availability

1160. The assessment of the potential effects of changes to prey availability during the O&M phase on the Copinsay SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Copinsay SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Copinsay SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1161. The details of the assessment of the potential effects of changes in prey availability during the O&M on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Copinsay SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Copinsay SPA kittiwake population.

4.4.10.2.4 Project Alone Conclusion

1162. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Copinsay SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one thirtieth of an adult bird and only 0.002% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Copinsay SPA kittiwake population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.10.2.5 *Effects In-combination*

4.4.10.2.5.1 Effects of Relevance to the In-combination Assessment

1163. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Copinsay SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1164. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the Copinsay SPA kittiwake population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.10.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1165. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Copinsay SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1166. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.133**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1167. Full details of the displacement mortality estimates for the Copinsay SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.135**).

Table 4.135: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	0.54	0.28
	Upper mortality estimate	1.62	0.84
Including Berwick Bank Wind Farm	Lower mortality estimate	0.63	0.32
	Upper mortality estimate	1.88	0.97
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1168. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock WFDA alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from one to two breeding adult birds and zero to one subadult bird, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are one to two adults and zero to one subadults (**Table 4.135**).
1169. In terms of the additional annual mortality of adult birds, these estimates represent 0.0283% (lower estimate) to 0.0849% (upper estimate) of the current adult breeding population at this colony (i.e. 1,910 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0327% (lower estimate) to 0.0982% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.194% to 0.582% (with the Berwick Bank Wind Farm effects excluded) and 0.224% to 0.673% (with the Berwick Bank Wind Farm effects included).
1170. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was

undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.136: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	8,772	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	8,715	1.0337	0.9998	0.9917	49.50
	Upper mortality estimate	8,562	1.0331	0.9993	0.9741	47.72
Including Berwick Bank	Lower mortality estimate	8,689	1.0336	0.9997	0.9899	49.38
	Upper mortality estimate	8,525	1.0330	0.9991	0.9704	47.24

1171. No adverse effect on the Copinsay SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 3% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.09% (**Table 4.136**). The metrics for the lower mortality estimates indicate a reduction of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.03% in the annual population growth rate.
1172. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Copinsay SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm

effects) remained at 3% and 1% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1173. Based upon the above, the potential levels of impact on the Copinsay SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.10.2.5.3 Collision Risk – Operation and Maintenance

1174. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Copinsay SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1175. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1176. Full details of the collision estimates for the Copinsay SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.137**).

Table 4.137: Potential Annual Mortality of Copinsay SPA Kittiwakes due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	1.85	0.99
Including Berwick Bank Wind Farm	2.15	1.14

1177. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock WFDA alone. Thus, the potential mortality ranges from two breeding adult birds and one subadult bird, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.137**).

1178. In terms of the additional annual mortality of adult birds, these estimates represent 0.0967% (Berwick Bank excluded) and 0.1124% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 1,910 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.663% (Berwick Bank excluded) to 0.770% (Berwick Bank included).
1179. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.138: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	8,772	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	8,514	1.0331	0.9992	0.9703	47.14
Including Berwick Bank	8,455	1.0329	0.9990	0.9660	46.38

1180. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Copinsay SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 3% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.1% (**Table 4.138**).
1181. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.10.2.5.2**), the

additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, which also indicated a reduction of 3% in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1182. Based upon the above, the potential levels of impact on the Copinsay SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.10.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1183. The potential mortality attributed to the Copinsay SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.139**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.10.2.5.2** and **Section 4.4.10.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.139: Potential Annual Mortality of Copinsay SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	2.39	1.27
	Upper mortality estimate	3.47	1.84
Including Berwick Bank Wind Farm	Lower mortality estimate	2.77	1.47
	Upper mortality estimate	4.02	2.11
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.135 and Table 4.137 due to rounding errors.			

1184. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from two to three breeding adult birds and one to two subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality

estimates with the Berwick Bank Wind Farm effects included are three to four adults and one to two subadults. These estimates represent 0.1250% (lower estimate) to 0.1816% (upper estimate) of the current adult breeding population at this colony (i.e. 1,910 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1451% (lower estimate) to 0.2106% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.856% to 1.244% (with the Berwick Bank Wind Farm effects excluded) and 0.994% to 1.443% (with the Berwick Bank Wind Farm effects included).

1185. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.140** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 6% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.19% (**Table 4.140**). The metrics for the lower mortality estimates indicate reductions of 5% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.13% in the annual population growth rate.

Table 4.140: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Copinsay SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	8,772	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	8,423	1.0327	0.9989	0.9621	46.08
	Upper mortality estimate	8,289	1.0323	0.9984	0.9446	44.84
Including Berwick Bank	Lower mortality estimate	8,406	1.0326	0.9987	0.9547	45.92
	Upper mortality estimate	8,199	1.0321	0.9981	0.9352	43.52

1186. As for the PVAs detailed in **Section 4.4.10.2.5.2** and **Section 4.4.10.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 6% for the upper mortality estimate and reduced to 4% for the lower mortality estimate (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.10.2.6 In-combination Conclusion

1187. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Copinsay SPA kittiwake population is predicted to cause the population to be up to 6% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Copinsay SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Copinsay SPA kittiwake population (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.10.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one thirtieth of an adult bird, representing only 0.002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1188. The scale of the potential reduction in the size of the SPA population associated with the in-combination effects (relative to that predicted in the absence of any wind farm effects) is small. Although the SPA population has now declined to a very low level and has an 'unfavourable declining' condition status (**Table 4.131**), it is considered that the level of the potential impact resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is insufficient to affect the status of this population or hinder recovery should that occur.
1189. Consequently, it is concluded that there is no potential for an adverse effect on the Copinsay SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.10.3 Assessment for the Great Black-backed Gull Population

1190. The assessment for the Copinsay SPA great black-backed gull population is exactly as for the East Caithness Cliffs SPA great black-backed gull population (see **Section 4.4.8.4**), but noting that the apportioning estimates for the Copinsay SPA population for the non-breeding period are 0.0048 and 0.0060 for adult and subadult birds, respectively (Table 3.4 in **Appendix 10.5: Offshore**

Ornithology Apportioning Technical Report (Volume IV)). The equivalent apportioning values for the East Caithness Cliffs SPA population are 0.0038 and 0.0048 for adult and subadult birds, respectively.

1191. Given this, it is concluded that any effects from the Bellrock Wind Farm Infrastructure alone on the SPA population will be, at most, small and highly localised. As such, there is no potential for an adverse effect on the Copinsay SPA great black-backed gull population as a result of the Wind Farm Infrastructure alone. Furthermore, it is considered that there is no potential for any effects to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects. Thus, there is also no potential for an adverse effect on this SPA population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.

4.4.10.4 Assessment for the Breeding Seabird Assemblage

1192. The breeding seabird assemblage for the Copinsay SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 70,000 individual breeding seabirds). Kittiwake and great black-backed gull are amongst the four species identified in the citation as having nationally important populations which contribute to the Copinsay SPA breeding seabird assemblage.
1193. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to both the SPA kittiwake and SPA great black-backed gull populations, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA kittiwake population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that kittiwake and great black-backed gull are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA process.
1194. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Copinsay SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.10.5 Site Conclusion

1195. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Copinsay SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Copinsay SPA.

4.4.11 Flamborough and Filey Coast SPA

4.4.11.1 European Site Information and Conservation Objectives

1196. The coastal section of the Flamborough and Filey Coast SPA covers a slender strip of cliffs and hinterland along the coastline of the counties of North Yorkshire and the East Riding of Yorkshire, located approximately 280 km from the Bellrock WFDA. The SPA is in two sections: the southern section extends north from South Landing around Flamborough Head to Speeton; the northern section covers the peninsula of Filey Brigg before extending northwest to Cunstone Nab. The seaward boundary extends 2 km into the marine environment throughout the two sections of the site. Flamborough Head and Bempton Cliffs was classified as an SPA in 1993, with the site extended and renamed as the Flamborough and Filey Coast SPA in 2018.
1197. Flamborough and Filey Coast SPA qualifies under Article 4.2 by regularly supporting populations of European importance of four migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including five species named only as component species (**Table 4.141**). The potential for LSE has been identified in relation to three of the nine qualifying species (**Table 4.141**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1198. The conservation objectives of this SPA (as determined through [Natural England's Access to Evidence](#)) are to:
- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
 - The extent and distribution of the habitats of the qualifying features;
 - The structure and function of the habitats of the qualifying features;
 - The supporting processes on which the habitats of the qualifying features rely;
 - The populations of each of the qualifying features; and
 - The distribution of qualifying features within the site.
1199. Further information on this European Site, including the Supplementary Advice on Conservation Objectives (SACOs) is available Natural England's Designated Sites View (Natural England, 2023c).
1200. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1201. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

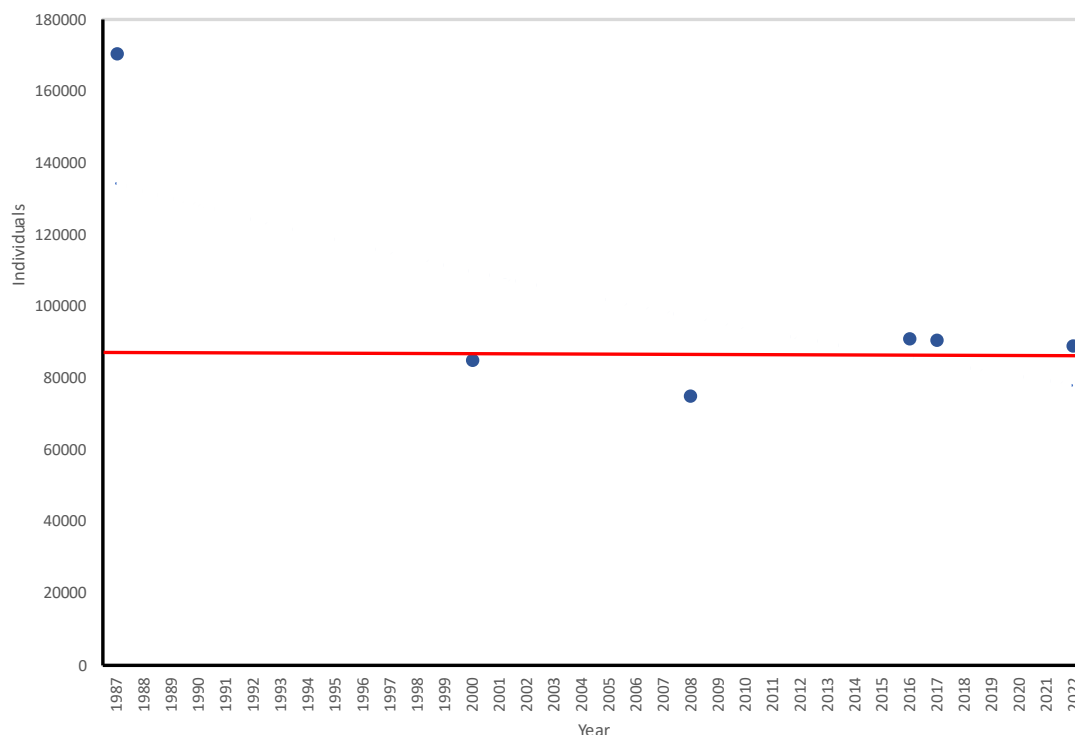
Table 4.141: Details on the Qualifying Features of the Flamborough and Filey Coast SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Not available	216,730 individuals	Yes
Kittiwake	Breeding	Not available	89,040 individuals	Yes
Herring gull ¹	Breeding	Not available	Not available	No
Guillemot	Breeding	Not available	83,214 individuals	No
Razorbill	Breeding	Not available	21,140 individuals	Yes
Puffin ¹	Breeding	Not available	Not available	No
Fulmar ¹	Breeding	Not available	Not available	No
Gannet	Breeding	Not available	16,938 individuals	Yes
Cormorant ¹	Breeding	Not available	Not available	No
Shag ¹	Breeding	Not available	Not available	No
Notes:				
¹ Named component of the assemblage only.				

4.4.11.2 Assessment for the Kittiwake Population

1202. The Flamborough and Filey Coast SPA kittiwake population is currently estimated to number 44,574 AON (which is taken to equate to 89,148 individuals), based upon the most recently available count data from 2022, representing the largest kittiwake colony in the UK (Clarkson et al. 2022). This is marginally higher than the citation level of 89,040 individuals (**Table 4.141**, **Plate 4.10**). There is uncertainty over the long-term trend in the size of this SPA population, with the citation population for the former Flamborough and Bempton Cliffs SPA (which was subsequently superseded by the Flamborough and Filey Coast SPA) being 170,790 individuals, as derived from counts undertaken in 1987. Subsequent counts in 2000 and 2008 gave estimates of approximately 85,000 and 75,000 individuals, respectively (JNCC and BTO, 2025), suggesting that the population underwent a major decline between the late 1980s and late 1990s (Natural England, 2023c). However, there is uncertainty over the veracity of the 1987 count, with a lack of supporting detail being available on survey methods and suggestions that the count unit may have been mistakenly transcribed as pairs (rather than individuals), whilst associated monitoring of breeding productivity predicts an increasing, not declining, population trend during this period (Coulson, 2011, 2017). As such, it is unclear whether this SPA population has been subject to a marked long-term decline (as shown in **Plate 4.10**) or gradual increase, although the SPA conservation objectives are based upon the former assumption.

Plate 4.10: Kittiwake Population Trend at the Flamborough & Filey Coast SPA Between 1987 and 2022. The Red Line Shows the Citation Population Size for the SPA (89,040 Individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)



4.4.11.2.1 The Potential for Impacts on the Kittiwake Population

1203. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**, the main focus of the assessment for this SPA population is concerned with the Conservation Objective '*to maintain and restore, the population of each of the qualifying features*'. In terms of the SACOs, this focus is most closely reflected in the '*breeding population: abundance*' attribute which has the target of restoring the size of the breeding population at a level which is above 83,700 breeding pairs, whilst avoiding deterioration from its current level (Natural England, 2023c). Clearly, other attributes (e.g. *connectivity with supporting habitats*) are also relevant but, as for the conservation objectives above, their significance is linked to whether they prevent achievement of the attribute concerned with restoring or maintaining the abundance of the breeding population.
1204. At a distance of 280 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Flamborough and Filey Coast SPA is just within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Flamborough and Filey Coast SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies,

which relate mainly to the early chick-rearing period, with such tracking data (and associated modelling of such data) for kittiwake from the SPA providing no evidence that their breeding season foraging ranges encroach on waters close to the Bellrock WFDA. Thus, tracking of 93 breeding kittiwakes from the Flamborough and Filey Coast SPA between 2010 and 2014 demonstrated no usage of the Bellrock WFDA (which was well beyond the 64 km mean maximum foraging range of the tracked birds), whilst this was also the case for subsequent kittiwake tracking studies at this SPA (Cleasby et al. 2018, Wakefield et al. 2017, Wischniewski et al. 2018).

1205. The apportioning calculations estimate that approximately 14% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Flamborough and Filey Coast SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Flamborough and Filey Coast SPA is somewhat lower than the estimated 14%.
1206. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Flamborough and Filey Coast SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
1207. Given the above, the Bellrock WFDA may have potential effects on Flamborough and Filey Coast SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.11.2.2 Project Alone: Construction and Decommissioning

4.4.11.2.2.1 Disturbance

1208. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Flamborough and Filey Coast SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Flamborough and Filey Coast SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1209. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Flamborough and Filey Coast SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.11.2.2.2 Displacement

1210. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Flamborough and Filey Coast SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Flamborough and Filey Coast SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1211. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Flamborough and Filey Coast SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.11.2.2.3 Changes to Prey Availability

1212. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Flamborough and Filey Coast SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Flamborough and Filey Coast SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1213. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Flamborough and Filey Coast SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Flamborough and Filey Coast SPA kittiwake population.

4.4.11.2.3 *Project Alone: Operation and Maintenance*

4.4.11.2.3.1 Disturbance

1214. The assessment of the potential effects of disturbance during the O&M phase on the Flamborough and Filey Coast SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Flamborough and Filey Coast SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1215. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the

basis of these details as applied to the Flamborough and Filey Coast SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Flamborough and Filey Coast SPA kittiwake population.

4.4.11.2.3.2 Displacement/Barrier Effects

1216. The potential effects of displacement and barrier effects during the O&M phase on the Flamborough and Filey Coast SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.142**). The resultant seasonal mortality estimates were then apportioned to the Flamborough and Filey Coast SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.142**.

Table 4.142: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.144	0.144	0.1
Autumn passage	94	N/A	0.054	0.032	N/A
Spring passage	84	N/A	0.072	0.032	N/A

1217. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Flamborough and Filey Coast SPA kittiwake population as a result of displacement is estimated to be 0.15 to 0.44 breeding adult birds and 0.03 to 0.07 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.143**). Over 67% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.143: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.110	0.007
	Autumn passage	30%	1%	0.016	0.010
	Spring passage	30%	1%	0.022	0.009

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
	Annual total	-	-	0.148	0.026
Upper mortality estimate	Breeding	30%	3%	0.342	0.023
	Autumn passage	30%	3%	0.044	0.026
	Spring passage	30%	3%	0.058	0.025
	Annual total	-	-	0.443	0.074

1218. The additional annual mortality of adult kittiwakes from the Flamborough and Filey Coast SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0005% (upper estimate) of the current adult breeding population at this colony (i.e. 89,148 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.003%.
1219. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.11.2.3.3 Collision Risk

1220. The collision estimates for the Flamborough and Filey Coast SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Flamborough and Filey Coast SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1221. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 1.87 adult and 0.32 subadult birds (**Table 4.144**). As with the displacement effects, most of this

mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.002% of the current adult breeding population at this colony (i.e. 89,148 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.014%.

Table 4.144: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Flamborough and Filey Coast SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	1.435	0.096
Autumn passage	0.232	0.136
Spring passage	0.206	0.091
Annual total	1.873	0.323

1222. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.11.2.3.4 Combined Collisions and Displacement/Barrier Effects

1223. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 2.02 and 2.31 adult and 0.35 to 0.40 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0023% to 0.0026% of the current adult breeding population at this colony (i.e. 89,148 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical**

Report (Volume IV)), this additional mortality equates to an increase of between 0.016% and 0.018%.

1224. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.11.2.3.5 Changes to Prey Availability

1225. The assessment of the potential effects of changes to prey availability during the O&M phase on the Flamborough and Filey Coast SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Flamborough and Filey Coast SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1226. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Flamborough and Filey Coast SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M to lead to an adverse effect on the Flamborough and Filey Coast SPA kittiwake population.

4.4.11.2.4 Project Alone Conclusion

1227. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA kittiwake population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.11.2.5 Effects In-combination

4.4.11.2.5.1 Effects of Relevance to the In-combination Assessment

1228. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1229. Therefore, the potential for effects of the Bellrock WFDA to act on the Flamborough and Filey Coast SPA kittiwake population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.11.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1230. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Flamborough and Filey Coast SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1231. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.143**), and which follow NatureScot (2023d) guidance. In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1232. Full details of the displacement mortality estimates for the Flamborough and Filey Coast SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.145**).

Table 4.145: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	28.47	14.18
	Upper mortality estimate	33.32	16.56
Including Berwick Bank Wind Farm	Lower mortality estimate	85.41	42.55
	Upper mortality estimate	99.95	49.68
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1233. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 28 to 33 breeding adult birds and 14 to 17 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates

with the Berwick Bank Wind Farm effects included are 85 to 100 adults and 43 to 50 subadults (**Table 4.145**).

1234. In terms of the additional annual mortality of adult birds, these estimates represent 0.0319% (lower estimate) to 0.0958% (upper estimate) of the current adult breeding population at this colony (i.e. 89,148 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0374% (lower estimate) to 0.1121% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see **Table 2.9 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.219% to 0.656% (with the Berwick Bank Wind Farm effects excluded) and 0.256% to 0.768% (with the Berwick Bank Wind Farm effects included).
1235. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.146: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	396,038	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	391,681	1.0337	0.9997	0.9899	48.72
	Upper mortality estimate	384,073	1.0332	0.9992	0.9702	46.82
Including Berwick Bank	Lower mortality estimate	391,319	1.0337	0.9997	0.9882	48.66
	Upper mortality estimate	382,242	1.0330	0.9990	0.9654	46.30

1236. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Flamborough and Filey Coast SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 3% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.08% (**Table 4.146**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.03% in the annual population growth rate.
1237. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Flamborough and Filey Coast SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 3% and 1% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1238. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.11.2.5.3 Collision Risk – Operation and Maintenance

1239. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Flamborough and Filey Coast SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1240. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1241. Full details of the collision estimates for the Flamborough and Filey Coast SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.147**).

Table 4.147: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	496.58	47.26
Including Berwick Bank Wind Farm	513.82	55.79

1242. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality ranges from 497 to 514 breeding adult birds and 47 to 56 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.147**).
1243. In terms of the additional annual mortality of adult birds, these estimates represent 0.5570% (Berwick Bank excluded) to 0.5764% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 89,148 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.815% (Berwick Bank excluded) to 3.948% (Berwick Bank included).
1244. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.148: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	396,038	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	344,444	1.0300	0.9962	0.8704	35.90
Including Berwick Bank	342,472	1.0299	0.9960	0.8652	35.46

1245. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Flamborough and Filey Coast SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value indicating a reduction of 13% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.38% (**Table 4.148**).
1246. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.11.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, with the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remaining at a 13% reduction in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1247. Given the scale of the potential reduction in the size of the Flamborough and Filey Coast SPA population it is concluded that the possibility of an adverse effect on the SPA population as a result of the predicted collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects cannot be excluded.

4.4.11.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1248. The potential mortality attributed to the Flamborough and Filey Coast SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.149**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.11.2.5.2**

and **Section 4.4.11.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.149: Potential Annual Mortality of Flamborough and Filey Coast SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	525.05	61.45
	Upper mortality estimate	581.99	89.81
Including Berwick Bank Wind Farm	Lower mortality estimate	547.13	72.35
	Upper mortality estimate	613.77	105.47
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.145 and Table 4.147 due to rounding errors.			

1249. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 525 to 582 breeding adult birds and 61 to 90 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 547 to 614 adults and 72 to 105 subadults. These estimates represent 0.5890% (lower estimate) to 0.6528% (upper estimate) of the current adult breeding population at this colony (i.e. 89,148 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.6137% (lower estimate) to 0.6885% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 4.034% to 4.471% (with the Berwick Bank Wind Farm effects excluded) and 4.204% to 4.716% (with the Berwick Bank Wind Farm effects included).
1250. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.149** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that exclude the predicted

mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 16% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.77% (**Table 4.150**). The metrics for the lower mortality estimates indicate reductions of 14% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.41% in the annual population growth rate.

Table 4.150: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	396,038	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	341,020	1.0298	0.9959	0.8618	35.06
	Upper mortality estimate	334,020	1.0292	0.9953	0.8447	33.02
Including Berwick Bank	Lower mortality estimate	338,029	1.0295	0.9957	0.8552	34.16
	Upper mortality estimate	330,797	1.0289	0.9950	0.8352	32.16

1251. As for the PVAs detailed in **Section 4.4.11.2.5.2** and **Section 4.4.11.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) reduced to 15% for the upper and remained at 14% lower mortality estimates (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.11.2.6 In-combination Conclusion

1252. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Flamborough and Filey Coast SPA kittiwake population is predicted to cause the population to be up to 16% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because

the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Flamborough and Filey Coast SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment.

1253. Although the Flamborough and Filey Coast SPA kittiwake population has been stable for at least the past two decades (**Plate 4.10**), it is considered that the scale of the potential reduction in the size of the SPA population associated with the in-combination effects (relative to that predicted in the absence of any wind farm effects) is sufficient to mean that the potential for an adverse effect due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
1254. Consequently, it is concluded that there is the potential for an adverse effect on the Flamborough and Filey Coast SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.11.3 Assessment for the Razorbill Population

1255. The Flamborough and Filey Coast SPA razorbill population is currently estimated to number 61,345 individuals based on counts from 2022 (Clarkson et al. 2022). This represents a substantial increase on the 37,476 individuals estimated for the Seabirds Count census for the period 2015 – 2021, with the Seabirds Count estimate, in turn, representing a 230% increase on the estimate from the Seabird 2000 census (Burnell et al. 2023). Razorbill is listed on the Flamborough and Filey Coast SPA citation as a designated feature, with a citation population size of 21,140 breeding individuals (**Table 4.141**). Thus, the current population size for the SPA is substantially in excess of citation level.

4.4.11.3.1 The Potential for Impacts on the Razorbill Population

1256. The Bellrock WFDA plus 2 km buffer does not overlap with the Flamborough and Filey Coast SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective concerning *the populations of each of the qualifying features*. In terms of the SACOs, this focus is most closely reflected in the *breeding populations abundance* attribute which has the target of maintaining the size of the breeding population above the citation level whilst avoiding deterioration from its current level (Natural England, 2023c). Clearly, other attributes (e.g. *connectivity with supporting habitats*) are also relevant but, as for the conservation objectives above, their significance is linked to whether they prevent achievement of the attribute concerned with maintaining the abundance of the breeding population.

1257. At a distance of 280 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Flamborough and Filey Coast SPA is beyond the mean maximum plus one standard deviation of the breeding season foraging range for razorbill, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). Consequently, there are deemed to be no breeding season impacts on the razorbill population from the Flamborough and Filey Coast SPA.
1258. In the non-breeding periods, razorbills tend to move to central areas of the North Sea towards Scandinavia (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Flamborough and Filey Coast SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods when travelling to and from their wintering areas (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1259. Given the above, the Bellrock WFDA may have potential effects on Flamborough and Filey Coast SPA razorbill population during non-breeding periods only.

4.4.11.3.2 Project Alone: Construction and Decommissioning

4.4.11.3.2.1 Disturbance

1260. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Flamborough and Filey Coast SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Flamborough and Filey Coast SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed.
1261. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the Flamborough and Filey Coast SPA razorbill population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.11.3.2.2 Displacement

1262. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Flamborough and Filey Coast SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Flamborough and Filey Coast SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1263. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the Flamborough and Filey Coast SPA razorbill population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.11.3.2.3 Changes to Prey Availability

1264. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Flamborough and Filey Coast SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Flamborough and Filey Coast SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1265. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the Flamborough and Filey Coast SPA razorbill population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Flamborough and Filey Coast SPA razorbill population.

4.4.11.3.3 *Project Alone: Operation and Maintenance*

4.4.11.3.3.1 Disturbance

1266. The assessment of the potential effects of disturbance during the O&M phase on the Flamborough and Filey Coast SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, as in **Section 4.4.2.3.3.1**, except that the Flamborough and Filey Coast SPA razorbill population is only being assessed in the non-breeding periods.
1267. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness *et al.* 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward *et al.* 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Flamborough and Filey Coast SPA razorbill population.

4.4.11.3.3.2 Displacement/Barrier Effects

1268. The potential effects of displacement and barrier effects during the O&M phase on the Flamborough and Filey Coast SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.2.3.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.151**). The resultant seasonal mortality estimates were then apportioned to the Flamborough and Filey Coast SPA and to the adult and subadult age classes, for non-breeding periods only, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.151**.

Table 4.151: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	0	0	0.07
Autumn passage	0	N/A	0.034	0.023	N/A
Winter	6	N/A	0.027	0.007	N/A
Spring passage	82	N/A	0.034	0.023	N/A

1269. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Flamborough and Filey Coast SPA razorbill population as a result of displacement is estimated to be 0.02 to 0.06 breeding adult birds and 0.01 to 0.04 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.152**). As detailed above, 100% of the potential mortality from displacement is predicted to occur during the non-breeding periods.

Table 4.152 Potential Annual Mortality of Flamborough and Filey Coast SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.020	0.014
	Annual total	-	-	0.020	0.014
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.003	0.001
	Spring passage	60%	3%	0.061	0.041
	Annual total	-	-	0.064	0.042

1270. The additional annual mortality of adult razorbills from the Flamborough and Filey Coast SPA population predicted due to displacement from the Bellrock WFDA represents 0.0000% (lower estimate) to 0.0001% (upper estimate) of the current adult breeding population at this colony (i.e. 61,345 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.000% and 0.001%.
1271. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.11.3.3.3 Secondary Entanglement

1272. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Flamborough and Filey Coast SPA).
1273. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Flamborough and Filey Coast SPA razorbill population as a result of secondary entanglement.

4.4.11.3.3.4 Changes to Prey Availability

1274. The assessment of the potential effects of changes to prey availability during the O&M phase on the Flamborough and Filey Coast SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, but noting that the Flamborough and Filey Coast SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1275. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the Flamborough and Filey Coast SPA razorbill population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Flamborough and Filey Coast SPA razorbill population.

4.4.11.3.4 Project Alone Conclusion

1276. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one seventeenth of an adult bird and only 0.00001% of the SPA population (with this population having an increasing trend), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Flamborough and Filey Coast SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.11.3.5 Effects In-combination

4.4.11.3.5.1 Effects of Relevance to the In-combination Assessment

1277. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1278. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the Flamborough and Filey Coast SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.11.3.5.2 Displacement/Barrier Effects

1279. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Flamborough and Filey Coast SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
1280. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.152**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).

1281. Full details of the displacement mortality estimates for the Flamborough and Filey Coast SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.153**).

Table 4.153: Potential Annual Mortality of Flamborough and Filey Coast SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	189.79	18.12
	Upper mortality estimate	357.74	54.33
Including Berwick Bank Wind Farm	Lower mortality estimate	193.33	20.41
	Upper mortality estimate	368.36	61.21
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

1282. The potential mortality on the Flamborough and Filey Coast SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects approximately three orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 190 to 358 adult birds and 18 to 54 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 193 to 386 adults and 20 to 61 subadults (**Table 4.153**). All mortality was attributed to the non-breeding periods.
1283. In terms of the additional annual mortality of adult birds, these estimates represent 0.3094% (lower estimate) to 0.5832% (upper estimate) of the current adult breeding population at this colony (i.e. 61,345 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.3152% (lower estimate) to 0.6005% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot,

2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.947% to 5.554% (with the Berwick Bank Wind Farm effects excluded) and 3.001% to 5.719% (with the Berwick Bank Wind Farm effects included).

1284. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.154: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	184,409	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	170,450	1.0230	0.9980	0.9250	41.00
	Upper mortality estimate	158,224	1.0210	0.9960	0.8580	32.80
Including Berwick Bank	Lower mortality estimate	170,030	1.0230	0.9980	0.9230	40.80
	Upper mortality estimate	157,087	1.0210	0.9960	0.8530	32.10

1285. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Flamborough and Filey Coast SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are as follows, the CPS value for the upper mortality estimate indicates a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.4% (**Table 4.154**). The metrics for the lower mortality estimates indicate reductions of 7% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.2% in the annual population growth rate.

1286. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Flamborough and Filey Coast SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) was at 14% and 7% for the upper and lower mortality estimates, respectively (Table 3.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.11.3.6 *In-combination Conclusion*

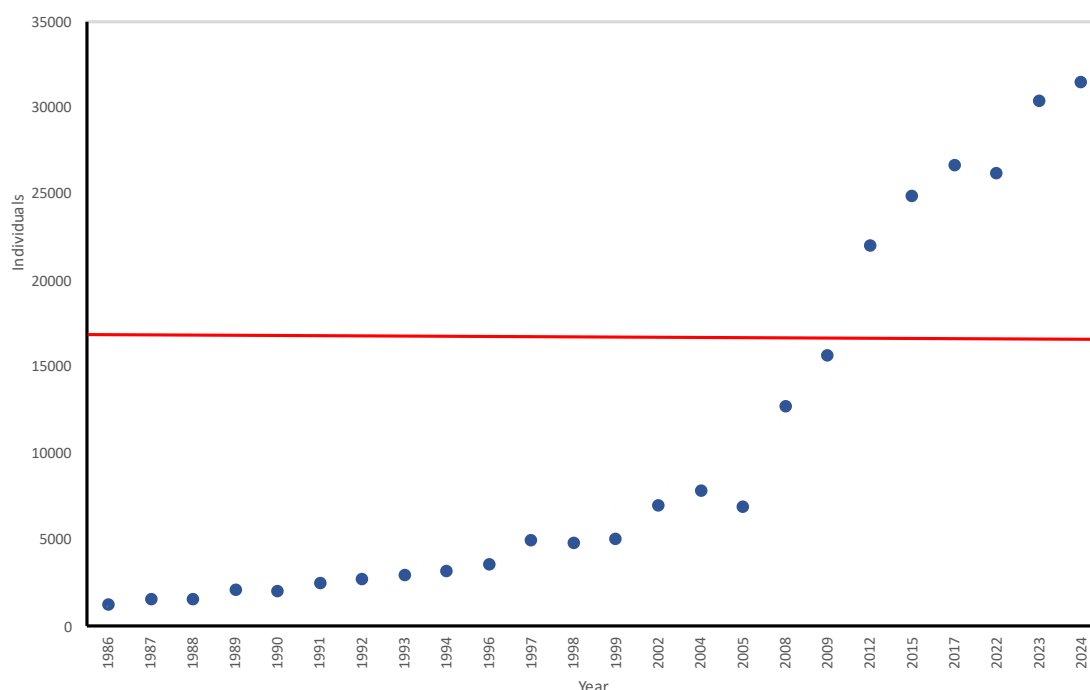
1287. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Flamborough and Filey Coast SPA razorbill population is predicted to cause the population to be up to 14% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Flamborough and Filey Coast SPA razorbills) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.11.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one seventeenth of an adult bird, representing only 0.00001% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1288. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has shown a considerable increase in numbers over the last two decades at least, and is currently well above the citation level (**Table 4.141**). Given this, it is concluded that there is no potential for an adverse effect on the Flamborough and Filey Coast SPA razorbill population as a result of the Wind Farm Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
1289. It is important to consider that this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA razorbill populations, which have been outlined in **Section 4.2.2**.

4.4.11.4 **Assessment for the Gannet Population**

1290. The Flamborough and Filey Coast SPA gannet population is currently estimated to number 15,794 AOS (equating to 31,588 individuals), based upon the most recently available count data from 2024 (JNCC and BTO, 2025). This is substantially higher than the citation level of 16,938 individuals (**Table 4.141**). Since colony establishment in the late 1930s the SPA population has shown a marked and consistent increase in numbers, with the annual population growth rate averaging approximately 11% (Natural England, 2020, **Plate 4.11**). The population was estimated as fewer

than 1,500 individuals in the mid-1980s, increasing to approximately 7,000 individuals by 2005 and over 26,500 individuals by 2017. Thus, the annual growth rates remain high, averaging almost 8% when considered over either the previous 20 or 40 years. In contrast to the Forth Islands SPA gannet population, there is little evidence from the colony counts of a marked effect from the HPAI outbreak and the 2023 and 2024 counts continue to show an increasing trend (**Plate 4.11**).

Plate 4.11: Gannet Population Trend at the Flamborough and Filey Coast SPA for the Period 1986 - 2024. The Red Line Shows the Citation Population Size for the SPA (16,938 individuals). Data are from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)



4.4.11.4.1 The Potential for Impacts on the Gannet Population

1291. The Bellrock WFDA plus 2 km buffer does not overlap with the Flamborough and Filey Coast SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this qualifying feature is concerned with the Conservation Objective of *maintaining or restoring the populations of each qualifying feature*, because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this Conservation Objective (as for *maintaining or restoring the structure and function of the habitats of the qualifying features*, because habitat structure and function would only be considered significant if it caused an adverse effect on the maintenance or restoration of the population of the qualifying features). In terms of the SACOs, this focus is most closely reflected in the '*breeding population: abundance*' attribute which has the target of maintaining the abundance of the breeding population of this feature above the citation level, whilst avoiding deterioration from its current level (Natural England, 2023c). Clearly, other attributes (e.g. *connectivity with supporting habitats*) are also relevant but, as for the conservation objectives above, their significance is linked to whether they prevent achievement of the attribute concerned with maintaining the abundance of the breeding population.

1292. At a distance of 280 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Flamborough and Filey Coast SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity, and is also within the mean (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Flamborough and Filey Coast SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, tracking data for gannet from the SPA provide no evidence that their breeding season foraging ranges encroach on waters close to the Bellrock WFDA, whilst analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Langston et al. 2013, Wakefield et al. 2013).
1293. The apportioning calculations estimate that approximately 6% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this is likely to be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.
1294. Gannets from the Flamborough and Filey Coast SPA move south in autumn to winter in more southern waters, returning north in the spring, with the passage movements during both periods involving routes which mean that birds from the SPA population may pass through the Bellrock WFDA and 2 km buffer (Furness, 2015). Thus, the non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness, 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1295. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the Flamborough and Filey Coast SPA gannet population to occur during breeding and non-breeding periods.

4.4.11.4.2 Project Alone: Construction and Decommissioning

4.4.11.4.2.1 Disturbance

1296. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Flamborough and Filey Coast SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Flamborough and Filey Coast SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that tracking data (and the associated modelling of foraging ranges from such data) also suggest little usage of the Bellrock WFDA during the breeding season by gannets from the Flamborough and Filey Coast SPA (Langston et al. 2013, Wakefield et al. 2013).
1297. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.1**. On the basis of these details as applied to the Flamborough and Filey Coast SPA

gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Flamborough and Filey Coast SPA gannet population.

4.4.11.4.2.2 Displacement

1298. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Flamborough and Filey Coast SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Flamborough and Filey Coast SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that tracking data (and the associated modelling of foraging ranges from such data) also suggest little usage of the Bellrock WFDA during the breeding season by gannets from the Flamborough and Filey Coast SPA (Langston et al. 2013, Wakefield et al. 2013).
1299. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the Flamborough and Filey Coast SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Flamborough and Filey Coast SPA gannet population.

4.4.11.4.2.3 Changes to Prey Availability

1300. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Flamborough and Filey Coast SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Forth Islands SPA and that tracking data (and the associated modelling of foraging ranges from such data) also suggest little usage of the Bellrock WFDA during the breeding season by gannets from the Flamborough and Filey Coast SPA (Langston et al. 2013, Wakefield et al. 2013).
1301. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Flamborough and Filey Coast SPA gannet population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Flamborough and Filey Coast SPA gannet population.

4.4.11.4.3 *Project Alone: Operation and Maintenance*

4.4.11.4.3.1 Disturbance

1302. The assessment of the potential effects of disturbance during the O&M phase on the Flamborough and Filey Coast SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Forth Islands SPA and that tracking data (and the associated modelling of foraging ranges from such data) also suggest little usage of the Bellrock WFDA during the breeding season by gannets from the Flamborough and Filey Coast SPA (Langston et al. 2013, Wakefield et al. 2013).

1303. The details of the assessment of the potential effects of O&M phase disturbance on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the Flamborough and Filey Coast SPA gannet population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Flamborough and Filey Coast SPA gannet population.

4.4.11.4.3.2 Displacement/Barrier Effects

1304. The potential effects of displacement and barrier effects during the O&M phase on the Flamborough and Filey Coast SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.155**). The resultant seasonal mortality estimates were then apportioned to the Flamborough and Filey Coast SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.155**.

Table 4.155: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Flamborough and Filey Coast SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.062	0.062	0.10
Autumn passage	224	N/A	0.048	0.035	N/A
Spring passage	159	N/A	0.062	0.029	N/A

1305. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Flamborough and Filey Coast SPA gannet population as a result of displacement is estimated to be 0.24 to 0.73 breeding adult birds and 0.09 to 0.27 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.156**). Approximately 30% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.156: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.098	0.003
	Autumn passage	70%	1%	0.078	0.057
	Spring passage	70%	1%	0.069	0.032
	Annual total	-	-	0.244	0.091
Upper mortality estimate	Breeding	70%	3%	0.293	0.009
	Autumn passage	70%	3%	0.228	0.166
	Spring passage	70%	3%	0.206	0.095
	Annual total	-	-	0.727	0.270

1306. The additional annual mortality of adult gannets from the Flamborough and Filey Coast SPA population predicted due to displacement from the Bellrock WFDA represents 0.0008% (lower estimate) to 0.0023% (upper estimate) of the current adult breeding population at this colony (i.e. 31,588 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.010% and 0.028%.
1307. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.11.4.3.3 Collision Risk

1308. The collision estimates for the Flamborough and Filey Coast SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Flamborough and Filey Coast SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds

during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

1309. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.96 adult and 0.13 subadult birds (**Table 4.157**). In contrast to the displacement effects, most of this mortality (i.e. 76%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0030% of the current adult breeding population at this colony (i.e. 31,588 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.037%.

Table 4.157: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Flamborough and Filey Coast SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.802	0.025
Autumn passage	0.119	0.087
Spring passage	0.037	0.017
Annual total	0.959	0.129

1310. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.11.4.3.4 Combined Collisions and Displacement/Barrier Effects

1311. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between one and two adult and 0.22 and 0.40 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0038% to 0.0053% of the current adult breeding population at this colony (i.e. 31,588 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point

increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.047% and 0.066%.

1312. Based upon the above, the potential levels of impact on the Flamborough and Filey Coast SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.11.4.3.5 Changes to Prey Availability

1313. The assessment of the potential effects of changes to prey availability during the O&M phase on the Flamborough and Filey Coast SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Flamborough and Filey Coast SPA is further from the Bellrock WFDA than is the Forth Islands SPA and that tracking data (and the associated modelling of foraging ranges from such data) also suggest little usage of the Bellrock WFDA during the breeding season by gannets from the Flamborough and Filey Coast SPA (Langston et al. 2013, Wakefield et al. 2013).
1314. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.3**. On the basis of these details as applied to the Flamborough and Filey Coast SPA gannet population, it is considered that there is no potential for changes in prey availability during O&M phase to lead to an adverse effect on the Flamborough and Filey Coast SPA gannet population.

4.4.11.4.4 Project Alone Conclusion

1315. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.11.4.5 Effects In-combination

4.4.11.4.5.1 Effects of Relevance to the In-combination Assessment

1316. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Flamborough and Filey Coast SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

1317. Therefore, the potential for effects of the Bellrock WFDA to act on the Flamborough and Filey Coast SPA gannet population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.11.4.5.2 Displacement/Barrier effects – Operation and Maintenance

1318. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Flamborough and Filey Coast SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1319. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.156**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1320. Full details of the displacement mortality estimates for the Flamborough and Filey Coast SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.158**).

Table 4.158: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	79.77	7.72
	Upper mortality estimate	239.29	23.15
Including Berwick Bank Wind Farm	Lower mortality estimate	80.39	7.90
	Upper mortality estimate	241.15	23.69
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1321. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 80 to 239 breeding adult birds and eight to 23 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 80 to 241 adults and eight to 24 subadults (**Table 4.158**).
1322. In terms of the additional annual mortality of adult birds, these estimates represent 0.2525% (lower estimate) to 0.7575% (upper estimate) of the current adult breeding population at this colony (i.e. 31,588 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.2545% (lower estimate) to 0.7634% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see **Table 2.12 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.118% to 9.352% (with the Berwick Bank Wind Farm effects excluded) and 3.142% to 9.425% (with the Berwick Bank Wind Farm effects included).
1323. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.159: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	40,865	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	38,023	1.0041	0.9980	0.9297	36.86
	Upper mortality estimate	32,887	1.0000	0.9939	0.8039	15.52
Including Berwick Bank	Lower mortality estimate	38,061	1.0041	0.9980	0.9290	37.04
	Upper mortality estimate	32,810	1.0000	0.9939	0.8023	15.28

1324. No adverse effect on the Flamborough and Filey Coast SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The CPS value for the upper mortality estimate for this in-combination scenario indicates a reduction of 20% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.61% (**Table 4.159**). The metrics for the lower mortality estimates indicate reductions of 7% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.20% in the annual population growth rate.

1325. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Flamborough and Filey Coast SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact as measured by the CPS values, although the CPGR values remained unchanged compared to those for the 35 year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 20% and 7% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1326. Given the marked, and consistent, long-term increase in the size of the Flamborough and Filey Coast SPA gannet population, it is considered that these levels of impact would not result in an adverse effect on the SPA population (**Plate 4.11**) Based on the observed growth rates for this SPA population, which have averaged approximately 8% per annum over the past 40 years (**Section 4.4.11.4**), the predicted reduction in the annual population growth rate (i.e. 0.61% when the upper displacement mortality estimate is assumed) would be insufficient to prevent further increase and, hence, the SPA population would continue to remain above the citation level and would not deteriorate from its current level. More detailed consideration of the potential for impacts to the Flamborough and Filey Coast SPA gannet population due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is set out in the In-combination Conclusion below (**Section 4.4.11.4.6**).

4.4.11.4.5.3 Collision Risk – Operation and Maintenance

1327. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Flamborough and Filey Coast SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1328. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. As stated in **Section 4.4.1.2.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1329. Full details of the collision estimates for the Flamborough and Filey Coast SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.160**).

Table 4.160: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	159.98	4.66
Including Berwick Bank Wind Farm	161.51	4.73

1330. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is 160 adult and five subadult birds with the Berwick Bank Wind Farm collision estimates excluded, and 162 adult and five subadult birds with the Berwick Bank Wind Farm collision estimates included (**Table 4.160**).
1331. In terms of the additional annual mortality of adult birds, these estimates represent 0.5064% of the current adult breeding population at this colony (i.e. 31,588 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.5113% with the Berwick Bank Wind Farm effects included (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of the exclusion or inclusion of Berwick Bank, these estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 6.252% (Berwick Bank excluded) to 6.312% (Berwick Bank included).
1332. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.161: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	40,865	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	35,550	1.0022	0.9961	0.8696	25.56
Including Berwick Bank	35,593	1.0022	0.9961	0.8686	25.68

1333. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Flamborough and Filey Coast SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 13% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.39% (**Table 4.161**).
1334. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.11.4.5.2**), the additional PVAs for the collision mortality to the Flamborough and Filey Coast SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 13% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1335. Given the marked, and consistent, long-term increase in the size of the Flamborough and Filey Coast SPA gannet population, it is considered that this level of impact would not result in an adverse effect on the SPA population (**Plate 4.11**). Based on the observed growth rates for this SPA population, which have averaged approximately 8% per annum over the past 40 years (**Section 4.4.11.4**), the predicted reduction in the annual population growth rate (i.e. 0.39%) would be insufficient to prevent further increase and, hence, the SPA population would continue to remain above the citation level and would not deteriorate from its current level. More detailed consideration of the potential for impacts to the Flamborough and Filey Coast SPA gannet population due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is set out in the In-combination conclusion below (**Section 4.4.11.4.6**).

4.4.11.4.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1336. The potential mortality attributed to the Flamborough and Filey Coast SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.162**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.11.4.5.2** and **Section 4.4.11.4.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.162: Potential Annual Mortality of Flamborough and Filey Coast SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	239.74	12.38
	Upper mortality estimate	399.27	27.81
Including Berwick Bank Wind Farm	Lower mortality estimate	241.90	12.62
	Upper mortality estimate	402.66	28.42
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.158 and Table 4.160 due to rounding errors.			

1337. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 240 to 399 breeding adult birds and 12 to 28 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 242 to 403 adults and 13 to 28 subadults. These estimates represent 0.7590% (lower estimate) to 1.2640% (upper estimate) of the current adult breeding population at this colony (i.e. 31,588 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.7658% (lower estimate) to 1.2747% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 9.370% to 15.605% (with the Berwick Bank Wind Farm effects excluded) and 9.454% to 15.737% (with the Berwick Bank Wind Farm effects included).
1338. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.162** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 30% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm

effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 1.00% (**Table 4.163**). The metrics for the lower mortality estimates indicate reductions of 19% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.59% in the annual population growth rate.

Table 4.163: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Flamborough and Filey Coast SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	40,865	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	33,087	1.0002	0.9941	0.8085	16.02
	Upper mortality estimate	28,559	0.9961	0.9901	0.6988	5.46
Including Berwick Bank	Lower mortality estimate	33,008	1.0001	0.9941	0.8068	15.86
	Upper mortality estimate	28,485	0.9961	0.9900	0.6968	5.40

1339. As for the PVAs detailed in **Section 4.4.11.4.5.2** and **Section 4.4.11.4.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 30% and 19% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.11.4.6 In-combination Conclusion

1340. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Flamborough and Filey Coast SPA gannet population is predicted to result in the population being up to 30% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 1.00%.

1341. As detailed above, the Flamborough and Filey Coast SPA gannet population has shown a marked, and consistent, long-term increase in size which reflected the wider trend in gannet populations across the UK, at least until the HPAI outbreak in 2022 (**Plate 4.11**, Murray et al. 2015, Natural England, 2020, Burnell et al. 2023, Lane et al. 2023). The growth rate of this SPA population has averaged almost 8% per annum over the past 40 years, with this rate being broadly consistent across the full 40 year period (**Section 4.4.11.4**). Also, the SPA population has continued to increase in the years since the HPAI outbreak in 2022 (**Plate 4.11**).
1342. If the observed average growth rate of 8% per annum was to be maintained over the 35 year O&M period for the Bellrock WFDA, the Flamborough and Filey Coast SPA population would still be more than 10 times larger than currently, even when accounting for the 1.00% reduction in annual growth rate which is predicted as a result of the upper mortality estimate for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.163**). It is highly likely that the availability of resources (e.g. suitable nesting sites or the availability of prey) will limit further growth of the SPA population at some point within the next few years or decades, with the previous high rates of increase unlikely to be maintained. However, under these circumstances it is likely that there would remain a considerable capacity for population regulation via the operation of compensatory density dependence, and the observed long-term population growth rate suggests that the potential levels of recruitment to the SPA population would remain high in the event that the carrying capacity was reached. Thus, the SPA population would be expected to remain stable despite an increase in mortality of the scale predicted due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.
1343. Consequently, it is concluded that there is no potential for an adverse effect on the Flamborough and Filey Coast SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.11.5 Assessment for the Breeding Seabird Assemblage

1344. The breeding seabird assemblage for the Flamborough and Filey Coast SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation stating that the SPA supports 216,730 individual seabirds). Kittiwake, razorbill and gannet are all qualifying features of the SPA in their own right, and are amongst the nine species identified in the citation as having nationally important populations which contribute to the Flamborough and Filey Coast SPA breeding seabird assemblage.
1345. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, the potential for an adverse effect is identified only for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects, and not for the Bellrock Wind Farm Infrastructure alone. However, in relation to the SPA razorbill and SPA gannet populations, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA razorbill population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The

other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake, razorbill and gannet are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, the potential for an adverse effect is identified only in relation to kittiwake (and only as a result of the in-combination effects).

1346. The Flamborough and Filey Coast SPA kittiwake population is currently estimated to number 44,574 AON. Given the size of this population and the scale of the potential impacts, it is considered that there is no risk of this population being lost from the breeding seabird assemblage due to the effects from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Considering this together with the range of species present within the SPA seabird assemblage, their relative abundances and the fact that potential effects are limited to kittiwake, it is concluded that the potential effect on the SPA kittiwake population would not be sufficient to result in a subsequent adverse effect on the SPA seabird assemblage.
1347. Therefore, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Flamborough and Filey Coast SPA either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.11.6 Site Conclusion

1348. It is concluded that the possibility of an adverse effect cannot be excluded for the Flamborough and Filey Coast SPA population of breeding kittiwake. For the kittiwake population, the potential for an adverse effect arises from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (but not from the Bellrock Wind Farm Infrastructure alone). The predicted impacts on the SPA kittiwake population are not considered to be sufficient to lead to a potential adverse effect on the breeding seabird assemblage feature.
1349. Consequently, it is concluded that an Adverse Effect on Site Integrity of the Flamborough and Filey Coast SPA cannot be excluded due to effects of the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects.

4.4.12 Hoy SPA

4.4.12.1 European Site Information and Conservation Objectives

1350. Hoy is a mountainous island at the southwestern end of the Orkney archipelago, located approximately 276 km from the Bellrock WFDA. Hoy SPA covers the northern and western two-thirds of the island of Hoy. The boundary of Hoy SPA overlaps with that of Hoy SSSI, and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 2000, with the marine extension classified in 2009.
1351. Hoy SPA qualifies under Article 4.1 by regularly supporting populations of European importance of two Annex I species (**Table 4.164**). Hoy SPA also qualifies under Article 4.2 by regularly supporting a population of European importance of one migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including six species named only as component species (**Table 4.164**). The potential for LSE has been identified in relation to two of the nine qualifying

species (**Table 4.164**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.

1352. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1353. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1354. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.164: Details on the Qualifying Features of the Hoy SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	120,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	3,000 pairs	Yes
Great black-backed gull ¹	Breeding	Unfavourable declining	570 pairs	No
Great skua	Breeding	Unfavourable declining	1,900 pairs	No
Arctic skua ¹	Breeding	Unfavourable declining	59 pairs	Yes
Guillemot ¹	Breeding	Unfavourable, no change	13,400 pairs	No
Puffin ¹	Breeding	Unfavourable declining	3,500 pairs	No
Red-throated diver	Breeding	Favourable maintained	58 territories	No
Fulmar ¹	Breeding	Unfavourable, no change	35,000 pairs	No
Peregrine	Breeding	Favourable maintained	6 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.12.2 Assessment for the Kittiwake Population

1355. The Hoy SPA kittiwake population is currently estimated to number 266 AONs (which is taken to equate to 532 breeding adults), based upon the most recently available count data for the whole colony from 2015-2021 (Burnell et al. 2023). At the previous census count in 1998-2002, the SPA population was estimated to number 4,256 AONs. The further decline reflected in the most recent estimate means that the size of the SPA population is now substantially below the citation level of 3,000 breeding pairs (**Table 4.164**). The SPA population has an ‘unfavourable declining’ condition status.

4.4.12.2.1 The Potential for Impacts on the Kittiwake Population

1356. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *maintain and restore the qualifying features to ensure they are viable components of the SPA*.
1357. At a distance of 299 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Hoy SPA is just within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Hoy SPA kittiwakes during

the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Hoy SPA at any given time (Cleasby et al. 2018).

1358. The apportioning calculations estimate that <1% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Hoy SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Hoy SPA is somewhat lower than even the estimated <1%.
1359. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Hoy SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
1360. Given the above, the Bellrock WFDA may have potential effects on Hoy SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.12.2.2 Project Alone: Construction and Decommissioning

4.4.12.2.2.1 Disturbance

1361. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Hoy SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Hoy SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Hoy SPA (Cleasby et al. 2018).
1362. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Hoy SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.12.2.2.2 Displacement

1363. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Hoy SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Hoy SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Hoy SPA (Cleasby et al. 2018).

1364. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Hoy SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.12.2.2.3 Changes to Prey Availability

1365. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Hoy SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Hoy SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Hoy SPA (Cleasby et al. 2018).
1366. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Hoy SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Hoy SPA kittiwake population.

4.4.12.2.3 Project Alone: Operation and Maintenance

4.4.12.2.3.1 Disturbance

1367. The assessment of the potential effects of disturbance during the O&M phase on the Hoy SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Hoy SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Hoy SPA (Cleasby et al. 2018).
1368. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Hoy SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Hoy SPA kittiwake population.

4.4.12.2.3.2 Displacement/Barrier Effects

1369. The potential effects of displacement and barrier effects during the O&M phase on the Hoy SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.165**). The resultant seasonal mortality estimates were then apportioned to the Hoy SPA and to the adult and subadult age classes, with account

also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.165**.

Table 4.165: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Hoy SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.001	0.001	0.1
Autumn passage	94	N/A	0.001	0.000	N/A
Spring passage	84	N/A	0.001	0.000	N/A

1370. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Hoy SPA kittiwake population as a result of displacement is estimated to be 0.001 to 0.003 breeding adult birds and 0 to 0.001 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.166**). Over 60% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.166: Potential Annual Mortality of Hoy SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.001	0.000
	Autumn passage	30%	1%	0.000	0.000
	Spring passage	30%	1%	0.000	0.000
	Annual total	-	-	0.001	0.000
Upper mortality estimate	Breeding	30%	3%	0.002	0.000
	Autumn passage	30%	3%	0.000	0.000
	Spring passage	30%	3%	0.001	0.000
	Annual total	-	-	0.003	0.001

1371. The additional annual mortality of adult kittiwakes from the Hoy SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0006% (upper estimate) of the current adult breeding population at this colony (i.e. 532 individuals) (Table 2.2 in

Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.004%.

1372. Based upon the above, the potential levels of impact on the Hoy SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.12.2.3.3 Collision Risk

1373. The collision estimates for the Hoy SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Hoy SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1374. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.02 adult and 0.00 subadult birds (**Table 4.167**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0027% of the current adult breeding population at this colony (i.e. 532 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.019%.

Table 4.167: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Hoy SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.010	0.001
Autumn passage	0.002	0.001
Spring passage	0.002	0.001
Annual total	0.015	0.003

1375. Based upon the above, the potential levels of impact on the Hoy SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.12.2.3.4 Combined Collisions and Displacement/Barrier Effects

1376. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.016 and 0.018 adult and 0.003 and 0.004 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0030% to 0.0034% of the current adult breeding population at this colony (i.e. 532 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.020% and 0.023%.
1377. Based upon the above, the potential levels of impact on the Hoy SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.12.2.3.5 Changes to Prey Availability

1378. The assessment of the potential effects of changes to prey availability during the O&M phase on the Hoy SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Hoy SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging

distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Hoy SPA (Cleasby et al. 2018).

1379. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Hoy SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Hoy SPA kittiwake population.

4.4.12.2.4 Project Alone Conclusion

1380. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Hoy SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents less than one fiftieth of an adult bird and only 0.003% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Hoy SPA kittiwake population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.12.2.5 Effects In-combination

4.4.12.2.5.1 Effects of Relevance to the In-combination Assessment

1381. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Hoy SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1382. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the Hoy SPA kittiwake population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.12.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1383. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Hoy SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).

1384. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.166**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1385. Full details of the displacement mortality estimates for the Hoy SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.168**).

Table 4.168: Potential Annual Mortality of Hoy SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	0.34	0.19
	Upper mortality estimate	1.01	0.57
Including Berwick Bank Wind Farm	Lower mortality estimate	0.39	0.22
	Upper mortality estimate	1.16	0.65
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1386. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 0.34 to 1.01 breeding adult birds and 0.19 to 0.57 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 0.39 to 1.16 adults and 0.22 to 0.65 subadults (**Table 4.168**).
1387. In terms of the additional annual mortality of adult birds, these estimates represent 0.0632% (lower estimate) to 0.1897% (upper estimate) of the current adult breeding population at this colony (i.e. 532 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0727% (lower estimate) to 0.2182% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability**

Technical Report (Volume IV)), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.433% to 1.299% (with the Berwick Bank Wind Farm effects excluded) and 0.498% to 1.495% (with the Berwick Bank Wind Farm effects included).

1388. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.169: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	2,444	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	2,397	1.0330	0.9990	0.9800	48.20
	Upper mortality estimate	2,293	1.0320	0.9980	0.9420	44.20
Including Berwick Bank	Lower mortality estimate	2,384	1.0330	0.9990	0.9770	47.60
	Upper mortality estimate	2,280	1.0320	0.9980	0.9330	43.80

1389. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Hoy SPA kittiwake population was concluded in

relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 7% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.20% (**Table 4.169**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.10% in the annual population growth rate.

1390. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Hoy SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 7% and 2% for the upper and lower mortality estimates, respectively (**Table 3.2 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1391. Based upon the above, the potential levels of impact on the Hoy SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.12.2.5.3 Collision Risk – Operation and Maintenance

1392. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Hoy SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1393. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1394. Full details of the collision estimates for the Hoy SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.170**).

Table 4.170: Potential Annual Mortality of Hoy SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	1.24	0.74
Including Berwick Bank Wind Farm	1.42	0.83

1395. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality ranges from one breeding adult birds and one subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.170**).
1396. In terms of the additional annual mortality of adult birds, these estimates represent 0.23% (Berwick Bank excluded) to 0.27% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 532 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.60% (Berwick Bank excluded) to 1.83% (Berwick Bank included).
1397. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.171: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	2,444	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	2,263	1.0320	0.9980	0.9230	43.00
Including Berwick Bank	2,241	1.0310	0.9980	0.9170	42.10

1398. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Hoy SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 8% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.20% (**Table 4.171**).
1399. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects (**Section 4.4.12.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 8% (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1400. Based upon the above, the potential levels of impact on the Hoy SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.12.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1401. The potential mortality attributed to the Hoy SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.172**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.12.2.5.2** and **Section 4.4.12.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.172: Potential Annual Mortality of Hoy SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	1.58	0.93
	Upper mortality estimate	2.25	1.31
Including Berwick Bank Wind Farm	Lower mortality estimate	1.80	1.04
	Upper mortality estimate	2.58	1.48
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.168 and Table 4.170 due to rounding errors.			

1402. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is two breeding adult birds and one subadult bird (for both the lower or upper ranges of the displacement mortality rates). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included range from two to three adults and one subadult in each case (according to the lower and upper ranges of the displacement mortality rates). These estimates represent 0.30% (lower estimate) to 0.42% (upper estimate) of the current adult breeding population at this colony (i.e. 532 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.34% (lower estimate) to 0.48% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 2.03% to 2.90% (with the Berwick Bank Wind Farm effects excluded) and 2.32% to 3.32% (with the Berwick Bank Wind Farm effects included).
1403. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.173** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 15% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects,

whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.40% (**Table 4.173**). The metrics for the lower mortality estimates indicate reductions of 11% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.30% in the annual population growth rate.

Table 4.173: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hoy SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	2,444	1.0340	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	2,226	1.0310	0.9970	0.9060	41.40
	Upper mortality estimate	2,132	1.0300	0.9960	0.8710	37.20
Including Berwick Bank	Lower mortality estimate	2,176	1.0310	0.9970	0.8940	39.20
	Upper mortality estimate	2,073	1.0290	0.9960	0.8510	34.50

1404. As for the PVAs detailed in **Section 4.4.12.2.5.2** and **Section 4.4.12.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were small decreases in the predicted levels of impact, with the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) estimated at 13% and 9% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.12.2.6 In-combination Conclusion

1405. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Hoy SPA kittiwake population is predicted to cause the population to be up to 15% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Hoy SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm and, therefore,

there is no provision for compensation to offset the predicted mortality from this project on the Hoy SPA kittiwake population (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.12.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (less than one fiftieth of an adult bird, representing only 0.003% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects).

1406. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the consistent, long term, decline of the Hoy SPA kittiwake population, its current small size and its 'unfavourable declining' condition status (**Table 4.164**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
1407. Consequently, it is concluded that there is the potential for an adverse effect on the Hoy SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.12.3 Assessment for the Breeding Seabird Assemblage

1408. The breeding seabird assemblage for the Hoy SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 120,000 individual breeding seabirds). Kittiwake is amongst the eight species identified in the citation as having nationally important populations which contribute to the Hoy SPA breeding seabird assemblage.
1409. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects, noting that if the assessment for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is undertaken, the potential for an adverse effect is identified for the SPA kittiwake population. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that kittiwake is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process but, as stated above, no potential for an adverse effect is identified for kittiwake.

1410. Given the above, it is concluded that there is no potential for an adverse effect on the Hoy SPA seabird assemblage in relation to the Bellrock WFDA alone or in-combination with other plans and projects. This conclusion would change if the in-combination impacts on the SPA kittiwake population were considered to represent a potential adverse effect. The Hoy SPA kittiwake population is currently estimated to number 266 AONs and has been declining over the long-term. It is considered that the scale of the potential in-combination impacts, in conjunction with the small size and long-term decline of this population, is sufficient to represent an increased risk of this population being lost from the breeding seabird assemblage. However, as stated above, in relation to the SPA kittiwake population, it is considered that the effects from the Bellrock Wind Farm Infrastructure alone represent no meaningful addition to the in-combination effects from the other plans and projects.

4.4.12.4 Site Conclusion

1411. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Hoy SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Hoy SPA.

4.4.13 Fair Isle SPA

4.4.13.1 European Site Information and Conservation Objectives

1412. The island of Fair Isle is the most southerly of the Shetland archipelago, lying halfway between Mainland Shetland and Orkney, and being approximately 300 km from the Bellrock WFDA. The boundary of Fair Isle SPA is coincident with Fair Isle SSSI and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1994, with the marine extension classified in 2009.
1413. The Fair Isle SPA qualifies under Article 4.1 by regularly supporting populations of European importance of two Annex I species, as well as under Article 4.2 by regularly supporting a population of European importance of one migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including eight species named only as component species (**Table 4.174**). The potential for LSE has been identified in relation to three of the eleven qualifying features or named components of the assemblage feature (**Table 4.174**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1414. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;

- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

1415. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1416. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.174: Details on the Qualifying Features of the Fair Isle SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable, no change	180,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	18,160 pairs	Yes
Arctic tern	Breeding	Unfavourable recovering	1,100 pairs	No
Great skua ¹	Breeding	Favourable maintained	110 pairs	No
Arctic skua ¹	Breeding	Unfavourable, no change	110 pairs	Yes
Guillemot	Breeding	Unfavourable, no change	32,300 individuals	No
Razorbill ¹	Breeding	Unfavourable, no change	3,400 individuals	No
Puffin ¹	Breeding	Unfavourable declining	23,000 individuals	No
Fulmar ¹	Breeding	Favourable maintained	35,210 pairs	No
Gannet ¹	Breeding	Favourable maintained	1,166 pairs	Yes
Shag ¹	Breeding	Unfavourable declining	1,100 pairs	No
Fair Isle wren	Breeding	Favourable maintained	33 territorial males	No
Notes:				
¹ Named component of the assemblage only.				

4.4.13.2 Assessment for the Kittiwake Population

1417. The Fair Isle SPA kittiwake population is currently estimated to number 448 AONs (which is taken to equate to 896 breeding adults), based upon the most recently available count data from 2021 (Burnell et al. 2023). This represents a decline of more than 95% from the 8,204 AONs estimated for the period 1998 – 2002 during the Seabird 2000 census, and the SPA population size is now

well below the citation level of 18,160 pairs (**Table 4.174**). The SPA population has an 'unfavourable declining' condition status.

4.4.13.2.1 *The Potential for Impacts on the Kittiwake Population*

1418. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *'to maintain and restore the populations of the qualifying features ensure they are viable components of the SPA'*.
1419. At a distance of 300 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Fair Isle SPA is just within the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is well beyond the mean breeding season foraging range of kittiwake (54.7 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Fair Isle SPA kittiwakes during the breeding season is likely to be low, despite the potential for connectivity. This is supported by the findings from tracking studies, which relate mainly to the early chick-rearing period. Thus, modelling of kittiwake tracking data from a range of UK colonies demonstrated that the Bellrock WFDA lies beyond areas that are expected to hold approximately 70% or more of the at-sea population of kittiwakes from the Fair Isle SPA at any given time (Wakefield et al. 2017, Cleasby et al. 2018). Additionally, tracking of 6 breeding kittiwakes from the Fair Isle SPA in 2021 demonstrated no usage of the Bellrock WFDA, which was well beyond the 64 km mean maximum foraging range of the tracked birds (Wakefield et al. 2017).
1420. The apportioning calculations estimate that <1% of the kittiwakes occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). However, in considering the estimated usage of the Bellrock WFDA by Fair Isle SPA kittiwakes during the breeding season, the same caveats apply as outlined for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**. Therefore, it is considered highly likely that the actual percentage of kittiwakes present on the Bellrock WFDA that are from the Fair Isle SPA is even lower than the estimated <1%.
1421. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the Fair Isle SPA population to pass through OWFs in the North Sea during the autumn and spring passage periods.
1422. Given the above, the Bellrock WFDA may have potential effects on Fair Isle SPA kittiwake population during breeding and non-breeding periods (but noting the above caveat regarding the likely overestimation of the extent of usage, and hence potential effects, during the breeding season). The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.13.2.2 *Project Alone: Construction and Decommissioning*

4.4.13.2.2.1 Disturbance

1423. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fair Isle SPA kittiwake population is essentially as for the Buchan

Ness to Collieston Coast SPA kittiwake population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Fair Isle SPA (Wakefield et al. 2017, Cleasby et al. 2018).

1424. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the Fair Isle SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.13.2.2.2 Displacement

1425. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Fair Isle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Fair Isle SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1426. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the Fair Isle SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.13.2.2.3 Changes to Prey Availability

1427. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Fair Isle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Fair Isle SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1428. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the Fair Isle SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Fair Isle SPA kittiwake population.

4.4.13.2.3 Project Alone: Operation and Maintenance

4.4.13.2.3.1 Disturbance

1429. The assessment of the potential effects of disturbance during the O&M phase on the Fair Isle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Fair Isle SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1430. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the Fair Isle SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Fair Isle SPA kittiwake population.

4.4.13.2.3.2 Displacement/Barrier Effects

1431. The potential effects of displacement and barrier effects during the O&M phase on the Fair Isle SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.175**). The resultant seasonal mortality estimates were then apportioned to the Fair Isle SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.175**.

Table 4.175: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fair Isle SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0.001	0.001	0.1
Autumn passage	94	N/A	0.001	0.001	N/A
Spring passage	84	N/A	0.001	0.001	N/A

1432. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Fair Isle SPA kittiwake population as a result of displacement is estimated to be 0.002 to 0.004 breeding adult birds and zero to 0.001 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.176**). Over 53% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.176: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	30%	1%	0.001	0
	Autumn passage	30%	1%	0	0
	Spring passage	30%	1%	0	0
	Annual total	-	-	0.002	0
Upper mortality estimate	Breeding	30%	3%	0.002	0
	Autumn passage	30%	3%	0.001	0.001
	Spring passage	30%	3%	0.001	0.001
	Annual total	-	-	0.004	0.001

1433. The additional annual mortality of adult kittiwakes from the Fair Isle SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0005% (upper estimate) of the current adult breeding population at this colony (i.e. 896 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.002% and 0.003%.

1434. Based upon the above, the potential levels of impact on the Fair Isle SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.13.2.3.3 Collision Risk

1435. The collision estimates for the Fair Isle SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Fair Isle SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during

the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

1436. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.02 adult and 0.01 subadult birds (**Table 4.177**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.002% of the current adult breeding population at this colony (i.e. 896 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.015%.

Table 4.177: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fair Isle SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.010	0.001
Autumn passage	0.005	0.003
Spring passage	0.004	0.002
Annual total	0.019	0.005

1437. Based upon the above, the potential levels of impact on the Fair Isle SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.13.2.3.4 Combined Collisions and Displacement/Barrier Effects

1438. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of 0.02 adult and 0.01 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0023% to 0.0026% of the current adult breeding population at this colony (i.e. 896 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the

potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.016% and 0.018%.

1439. Based upon the above, the potential levels of impact on the Fair Isle SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.13.2.3.5 Changes to Prey Availability

1440. The assessment of the potential effects of changes to prey availability during the O&M phase on the Fair Isle SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Buchan Ness to Collieston Coast SPA and that tracking data (and the associated modelling of foraging distributions from such data) also suggest little, if any, usage of the Bellrock WFDA during the breeding season by kittiwake from the Fair Isle SPA (Wakefield et al. 2017, Cleasby et al. 2018).
1441. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the Fair Isle SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the Fair Isle SPA kittiwake population.

4.4.13.2.4 Project Alone Conclusion

1442. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Fair Isle SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents one fiftieth of an adult bird and only 0.003% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Fair Isle SPA kittiwake population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.13.2.5 Effects In-combination

4.4.13.2.5.1 Effects of Relevance to the In-combination Assessment

1443. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Fair Isle SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level

that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the Fair Isle SPA kittiwake population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.13.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1444. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Fair Isle SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**). Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.176**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1445. Full details of the displacement mortality estimates for the Fair Isle SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.178**).

Table 4.178: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	0.58	0.30
	Upper mortality estimate	0.67	0.34
Including Berwick Bank Wind Farm	Lower mortality estimate	1.73	0.89
	Upper mortality estimate	2.02	1.03
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1446. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality is 0.58 to 0.67 breeding adult birds and 0.30 to 0.34 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are two adults in both estimates and 0.89 to 1.03 subadults (**Table 4.178**).
1447. In terms of the additional annual mortality of adult birds, these estimates represent 0.0642% (lower estimate) to 0.1927% (upper estimate) of the current adult breeding population at this colony (i.e. 896 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0752% (lower estimate) to 0.2256% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.440% to 1.320% (with the Berwick Bank Wind Farm effects excluded) and 0.515% to 1.545% (with the Berwick Bank Wind Farm effects included).
1448. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.179: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	1,726	1.0145	N/A	N/A	N/A

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Excluding Berwick Bank	Lower mortality estimate	1,691	1.0137	0.9994	0.9785	48.44
	Upper mortality estimate	1,627	1.0127	0.9982	0.9385	44.92
Including Berwick Bank	Lower mortality estimate	1,683	1.0136	0.9993	0.9743	47.94
	Upper mortality estimate	1,600	1.0123	0.9979	0.9286	43.34

1449. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Fair Isle SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 7% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.21% (**Table 4.179**). The metrics for the lower mortality estimates indicate reductions of 3% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.07% in the annual population growth rate.
1450. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Fair Isle SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 7% for the upper mortality estimate reduced to 2% for the lower mortality estimate (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1451. Based upon the above, the potential levels of impact on the Fair Isle SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.13.2.5.3 Collision Risk – Operation and Maintenance

1452. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Fair Isle SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in

operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).

1453. Details of the NEEOG Interim CEF collision totals are summarised In **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1454. Full details of the collision estimates for the Fair Isle SPA kittiwake population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.180**).

Table 4.180: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	2.01	1.02
Including Berwick Bank Wind Farm	2.35	1.20

1455. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is two adult birds and one subadult bird, for scenarios with the Berwick Bank Wind Farm collision estimates both included or excluded (**Table 4.180**).
1456. In terms of the additional annual mortality of adult birds, these estimates represent 0.2241% (Berwick Bank excluded) to 0.2627% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 896 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.535% (Berwick Bank excluded) to 1.799% (Berwick Bank included).

1457. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.181: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	1,726	1.0145	N/A	N/A	N/A
Excluding Berwick Bank	1,602	1.0123	0.9980	0.9308	43.44
Including Berwick Bank	1,578	1.0120	0.9976	0.9171	41.98

1458. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Farne Islands SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 8% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.24% (**Table 4.181**).
1459. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.13.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, which indicated a reduction of 8% in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1460. Based upon the above, the potential levels of impact on the Fair Isle SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.13.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1461. The potential mortality attributed to the Fair Isle SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.182**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.13.2.5.2** and **Section 4.4.13.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.182: Potential Annual Mortality of Fair Isle SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	2.58	1.32
	Upper mortality estimate	3.73	1.91
Including Berwick Bank Wind Farm	Lower mortality estimate	3.03	1.54
	Upper mortality estimate	4.37	2.23
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.178 and Table 4.180 due to rounding errors.			

1462. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from three to four breeding adult birds and one to two subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are three to four adults and two subadults. These estimates represent 0.2883% (lower estimate) to 0.4167% (upper estimate) of the current adult breeding population at this colony (i.e. 896 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.3379% (lower estimate) to 0.4882% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.975% to 2.854% (with the Berwick Bank Wind Farm effects excluded) and 2.314% to 3.344% (with the Berwick Bank Wind Farm effects included).

1463. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.183** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 15% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.43% (**Table 4.183**). The metrics for the lower mortality estimates indicate reductions of 11% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.31% in the annual population growth rate.

Table 4.183: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	1,726	1.0145	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	1,567	1.0117	0.9974	0.9111	41.14
	Upper mortality estimate	1,505	1.0107	0.9963	0.8751	37.38
Including Berwick Bank	Lower mortality estimate	1,544	1.0112	0.9969	0.8946	39.72
	Upper mortality estimate	1,472	1.0099	0.9957	0.8543	35.28

1464. As for the PVAs detailed in **Section 4.4.13.2.5.2** and **Section 4.4.13.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) reduced to 14% and 9% for the upper mortality estimates and remained at 11% for the lower mortality estimates (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.13.2.6 In-combination Conclusion

1465. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Fair Isle SPA kittiwake population is predicted to cause the population to be up to 15% smaller by the end of the 35 year operational

period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Fair Isle SPA kittiwake population was concluded in relation to the Berwick Bank Wind Farm and therefore there is no provision for compensation to offset the predicted mortality from this project on the Fair Isle SPA kittiwake population (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.13.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (one fiftieth of an adult bird, representing only 0.003% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1466. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the marked, long term, decline of the Fair Isle SPA kittiwake population, its current small size and its 'unfavourable declining' condition status (**Table 4.174**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality and not in relation to either the displacement or the collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these are considered separately.
1467. Consequently, it is concluded that there is the potential for an adverse effect on the Fair Isle SPA kittiwake population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.13.3 Assessment for the Gannet Population

1468. The Fair Isle SPA gannet population is currently estimated to number 5,592 AON (taken to equate to 11,184 individuals), based upon the most recently available count data from 2024 (JNCC and BTO, 2025). This represents an increase from the 4,971 AON estimated in 2021. The population has been increasing since establishment in the 1970s, with the 2021 count representing a substantial increase from the 1,875 AON estimated during the Seabird 2000 census for the period 1998 – 2002 (Murray et al. 2015, Burnell et al. 2023). The most recent increase has occurred despite the temporary decline to 4827 AON in 2023, following the HPAI outbreak in 2022 (Tremlett et al. 2024, JNCC and BTO, 2025). These estimates demonstrate that the SPA population has been above the citation level of 1,166 pairs for more than two decades (**Table 4.174**).

4.4.13.3.1 The Potential for Impacts on the Gannet Population

1469. The Bellrock WFDA plus 2 km buffer does not overlap with the Fair Isle SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring

in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this qualifying feature is concerned with the Conservation Objective *‘to maintain and restore the populations of the qualifying features ensure they are viable components of the SPA’*.

1470. At a distance of 300 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Fair Isle SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity, and is also within the mean (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Fair Isle SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Wakefield et al. 2013).
1471. The apportioning calculations estimate that approximately 1% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this may be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.
1472. Gannets from the Fair Isle SPA move south in autumn to winter in more southern waters, returning north in the spring, with the passage movements during both periods involving routes which mean that birds from the SPA population may pass through the Bellrock WFDA and 2 km buffer (Furness, 2015). Thus, the non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness, 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1473. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the Fair Isle SPA gannet population to occur during breeding and non-breeding periods.

4.4.13.3.2 Project Alone: Construction and Decommissioning

4.4.13.3.2.1 Disturbance

1474. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fair Isle SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Fair Isle SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.13.2**, see also Wakefield et al. 2013).
1475. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.1**. On the basis of these details as applied to the Fair Isle SPA gannet population, it is

considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Fair Isle SPA gannet population.

4.4.13.3.2.2 Displacement

1476. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Fair Isle SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Fair Isle SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.13.2**, see also Wakefield et al. 2013).
1477. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the Fair Isle SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Fair Isle SPA gannet population.

4.4.13.3.2.3 Changes to Prey Availability

1478. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Fair Isle SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.13.2**, see also Wakefield et al. 2013).
1479. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Fair Isle SPA gannet population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Fair Isle SPA gannet population.

4.4.13.3.3 *Project Alone: Operation and Maintenance*

4.4.13.3.3.1 Disturbance

1480. The assessment of the potential effects of disturbance during the O&M phase on the Fair Isle SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.5.5.3.1**, see also Wakefield et al. 2013).
1481. The details of the assessment of the potential effects of O&M phase disturbance on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the Fair Isle SPA gannet population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Fair Isle SPA gannet population.

4.4.13.3.3.2 Displacement/Barrier Effects

1482. The potential effects of displacement and barrier effects during the O&M phase on the Fair Isle SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.184**). The resultant seasonal mortality estimates were then apportioned to the Fair Isle SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.184**.

Table 4.184: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Fair Isle SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.015	0.015	0.10
Autumn passage	224	N/A	0.014	0.011	N/A
Spring passage	159	N/A	0.022	0.010	N/A

1483. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Fair Isle SPA gannet population as a result of displacement is estimated to be 0.07 to 0.21 breeding adult birds and 0.03 to 0.09 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.185**). Approximately 24% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.185: Potential Annual Mortality of Fair Isle SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.024	0.001
	Autumn passage	70%	1%	0.022	0.018
	Spring passage	70%	1%	0.024	0.011
	Annual total	-	-	0.070	0.030

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Upper mortality estimate	Breeding	70%	3%	0.071	0.002
	Autumn passage	70%	3%	0.065	0.052
	Spring passage	70%	3%	0.073	0.034
	Annual total	-	-	0.209	0.088

1484. The additional annual mortality of adult gannets from the Fair Isle SPA population predicted due to displacement from the Bellrock WFDA represents 0.0006% (lower estimate) to 0.0019% (upper estimate) of the current adult breeding population at this colony (i.e. 11,184 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.008% and 0.023%.
1485. Based upon the above, the potential levels of impact on the Fair Isle SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.13.3.3 Collision Risk

1486. The collision estimates for the Fair Isle SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Fair Isle SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1487. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.24 adult and 0.04 subadult birds (**Table 4.186**). In contrast to the displacement effects, most of this mortality (i.e. 71%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0022% of the current adult breeding population at this colony (i.e. 11,184 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of

the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.027%.

Table 4.186: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Fair Isle SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.194	0.006
Autumn passage	0.034	0.027
Spring passage	0.013	0.006
Annual total	0.241	0.040

1488. Based upon the above, the potential levels of impact on the Fair Isle SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.13.3.3.4 Combined Collisions and Displacement/Barrier Effects

1489. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.31 and 0.45 adult and 0.07 and 0.13 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0028% to 0.0040% of the current adult breeding population at this colony (i.e. 11,184 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.034% and 0.050%.
1490. Based upon the above, the potential levels of impact on the Fair Isle SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the

Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.13.3.3.5 Changes to Prey Availability

1491. The assessment of the potential effects of changes to prey availability during the O&M phase on the Fair Isle SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Fair Isle SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.13.2**, see also Wakefield et al. 2013).
1492. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Fair Isle SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Fair Isle SPA gannet population.

4.4.13.3.4 Project Alone Conclusion

1493. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Fair Isle SPA gannet population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents less than one half of an adult bird and only 0.004% of the SPA population (with this population having shown a long-term increase), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Fair Isle SPA gannet population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.13.3.5 Effects In-combination

4.4.13.3.5.1 Effects of Relevance to the In-combination Assessment

1494. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Fair Isle SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1495. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the Fair Isle SPA gannet population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.13.3.5.2 Displacement/Barrier Effects – Operation and Maintenance

1496. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Fair Isle SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1497. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.185**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1498. Full details of the displacement mortality estimates for the Fair Isle SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.187**).

Table 4.187: Potential Annual Mortality of Fair Isle SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	3.27	2.51
	Upper mortality estimate	9.80	7.52
Including Berwick Bank Wind Farm	Lower mortality estimate	3.49	2.61
	Upper mortality estimate	10.46	7.82
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1499. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects included, the potential mortality ranges from three to 10 breeding adult birds and three to eight subadult birds, depending on whether the lower

or upper ranges of the displacement mortality rates are used (note the exclusion of Berwick Bank makes little effect on potential mortality) (**Table 4.187**).

1500. In terms of the additional annual mortality of adult birds, these estimates represent 0.0292% (lower estimate) to 0.0876% (upper estimate) of the current adult breeding population at this colony (i.e. 11,184 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0312% (lower estimate) to 0.0936% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.361% to 1.082% (with the Berwick Bank Wind Farm effects excluded) and 0.385% to 1.155% (with the Berwick Bank Wind Farm effects included).

1501. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.188: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	14,457	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	14,332	1.0058	0.9997	0.9880	48.04
	Upper mortality estimate	13,955	1.0051	0.9990	0.9645	43.14
Including Berwick Bank	Lower mortality estimate	14,315	1.0058	0.9997	0.9875	47.84
	Upper mortality estimate	13,919	1.0050	0.9989	0.9626	42.58

1502. No adverse effect on the Fair Isle SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 4% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.11% (**Table 4.188**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.03% in the annual population growth rate.
1503. As for the PVAs for the Forth Islands SPA gannet population (**Section 4.4.5.5.2, Section 4.4.5.5.3** and **Section 4.4.5.5.4**), the additional PVAs for the displacement mortality to the Fair Isle SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact as measured by the CPS values, although the CPGR values remained unchanged compared to those for the 35 year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 4% and 1% for the upper and lower mortality estimates, respectively (**Table 3.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1504. Given the consistent, long-term increase in the size of the Fair Isle SPA gannet population, it is considered that these small levels of impact would not result in an adverse effect on the SPA population.

4.4.13.3.5.3 Collision Risk – Operation and Maintenance

1505. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Fair Isle SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1506. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. As stated in **Section 4.4.1.2.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1507. Full details of the collision estimates for the Fair Isle SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population**

Viability Technical Report (Volume IV). The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.189:**).

Table 4.189: Potential Annual Mortality of Fair Isle SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	3.36	1.79
Including Berwick Bank Wind Farm	3.63	1.82

1508. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality estimates are three breeding adult birds and two subadult birds, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are four adults and two subadults (**Table 4.189:**).
1509. In terms of the additional annual mortality of adult birds, these estimates represent 0.0301% of the current adult breeding population at this colony (i.e. 11,184 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0324% with the Berwick Bank Wind Farm effects included (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. These represent an increase in baseline mortality levels (i.e. without any wind farm impacts) which exceeds the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.371% (Berwick Bank excluded) to 0.400% (Berwick Bank included).
1510. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.190: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	14,457	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	14,333	1.0058	0.9997	0.9889	48.06
Including Berwick Bank	14,325	1.0058	0.9997	0.9891	47.94

1511. For the reasons given in **Section 4.4.13.3.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Fair Isle SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The predicted impacts for this in-combination scenario are small, with the CPS value for the predicted mortality indicating a reduction of 1% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.03% (**Table 4.190**).
1512. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.13.3.5.2**), the additional PVAs for the collision mortality to the Fair Isle SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 1% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1513. Given the consistent, long-term increase in the size of the Fair Isle SPA gannet population, it is considered that this small (and inconsequential) level of impact would not result in an adverse effect on the SPA population.

4.4.13.3.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1514. The potential mortality attributed to the Fair Isle SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.191**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.13.3.5.2** and **Section 4.4.13.3.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.191: Potential Annual Mortality of Fair Isle SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	6.63	4.29
	Upper mortality estimate	13.16	9.31
Including Berwick Bank Wind Farm	Lower mortality estimate	7.11	4.43
	Upper mortality estimate	14.09	9.64
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.187 and Table 4.189: due to rounding errors.			

1515. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from seven to 13 breeding adult birds and four to nine subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are seven to 14 adults and four to 10 subadults. These estimates represent 0.0593% (lower estimate) to 0.1177% (upper estimate) of the current adult breeding population at this colony (i.e. 11,184 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0636% (lower estimate) to 0.1260% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.732% to 1.453% (with the Berwick Bank Wind Farm effects excluded) and 0.785% to 1.555% (with the Berwick Bank Wind Farm effects included).
1516. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.191** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.13.3.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any

wind farm effects, whilst the associated reduction in annual population growth rate is 0.14% (**Table 4.192**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA gannet population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.07% in the annual population growth rate.

Table 4.192: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Fair Isle SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	14,457	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	14,171	1.0054	0.9994	0.9773	45.88
	Upper mortality estimate	13,817	1.0048	0.9987	0.9539	41.10
Including Berwick Bank	Lower mortality estimate	14,129	1.0054	0.9993	0.9759	45.32
	Upper mortality estimate	13,805	1.0047	0.9986	0.9512	40.94

1517. As for the PVAs detailed in **Section 4.4.13.3.5.2** and **Section 4.4.13.3.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% and 2% for the upper and lower mortality estimates respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.13.3.6 In-combination Conclusion

1518. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Fair Isle SPA gannet population is predicted to result in the population being up to 5% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 0.14%. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Fair Isle SPA gannet population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Fair Isle SPA gannet

population (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.13.3.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (less than one half of an adult bird, representing only 0.004% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1519. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which (despite the HPAI outbreak) has shown a considerable, and near-consistent, increase in numbers since colony establishment in the 1970s, is currently well above the citation level and has a 'favourable maintained' condition status (**Table 4.174**). Given this, it is concluded that there is no potential for an adverse effect on the Fair Isle SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
1520. As has been outlined in **Section 4.4.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.13.4 Assessment for the Breeding Seabird Assemblage

1521. The breeding seabird assemblage for the Fair Isle SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 180,000 individual breeding seabirds). Kittiwake and gannet are amongst the 10 species identified in the citation as having nationally important populations which contribute to the Fair Isle SPA breeding seabird assemblage.
1522. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to both species, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects, noting that if the assessments for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects are undertaken, the potential for an adverse effect is identified for the SPA kittiwake population but not for the SPA gannet population. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake and gannet are the only named components of the breeding seabird assemblage qualifying feature which have been taken forward to Phase Two of the HRA but, as stated above, no potential for an adverse effect is identified in relation to either of them.
1523. Given the above, it is concluded that there is no potential for an adverse effect on the SPA seabird assemblage in relation to the Bellrock WFDA alone or in-combination with other plans and projects. This conclusion would change if the in-combination impacts on the SPA kittiwake population were considered to represent a potential adverse effect. The Fair Isle SPA kittiwake population is currently estimated to number 448 AON. It is considered that the scale of the potential in-combination impacts, in conjunction with the small size and long-term decline of this population, is sufficient to represent an increased risk of this population being lost from the breeding seabird

assemblage. However, as stated above in relation to the SPA kittiwake population, it is considered that the effects from the Bellrock Wind Farm Infrastructure alone represent no meaningful addition to the in-combination effects from the other plans and projects.

4.4.13.5 Site Conclusion

1524. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Fair Isle SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Fair Isle SPA.

4.4.14 Calf of Eday SPA

4.4.14.1 European Site Information and Conservation Objectives

1525. The Calf of Eday SPA is a small maritime island to the north of Eday in Orkney covering approximately 2,700 ha. The Calf of Eday has a rocky shoreline with cliffs to the north and the west. The boundary of the SPA encompasses the boundary of the Calf of Eday SSSI, and the seaward extension extends approximately 2 km into the marine environment to include the seabed, water column and surface. The SPA was classified in 1998, with the site's marine extension classified in 2009.
1526. Calf of Eday SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including five features named as component species of the seabird assemblage feature (**Table 4.193**). The potential for LSE has been identified in relation to one of these component species (**Table 4.193**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1527. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1528. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1529. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.193: Details on the Qualifying Features of the Calf of Eday SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable, no change	30,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable, no change	1,717 pairs	No
Guillemot ¹	Breeding	Unfavourable, no change	12,645 individuals	No
Fulmar ¹	Breeding	Favourable maintained	1,955 pairs	No
Cormorant ¹	Breeding	Favourable maintained	223 pairs	No
Great black-backed gull ¹	Breeding	Unfavourable declining	938 pairs	Yes
Notes:				
¹ Named component of the assemblage only.				

4.4.14.2 Assessment for the Great Black-backed Gull Population

1530. The assessment for the Calf of Eday SPA great black-backed gull population is exactly as for the East Caithness Cliffs SPA great black-backed gull population (see **Section 4.4.8.4**), but noting that the apportioning estimates for the Calf of Eday SPA population for the non-breeding period are 0.0061 and 0.0077 for adult and subadult birds, respectively (Table 3.4 in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). The equivalent apportioning values for the East Caithness Cliffs SPA population are 0.0038 and 0.0048 for adult and subadult birds, respectively.
1531. Given this, it is concluded that that any effects from the Bellrock Wind Farm Infrastructure alone on the SPA population will be, at most, small and highly localised. As such, there is no potential for an adverse effect on the Calf of Eday SPA great black-backed gull population as a result of the Wind Farm Infrastructure alone. Furthermore, it is considered that there is no potential for any effects to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects. Thus, there is also no potential for an adverse effect on this SPA population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.

4.4.14.3 Assessment for the Breeding Seabird Assemblage

1532. The breeding seabird assemblage for the Calf of Eday SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 30,000 individual breeding seabirds). Great black-backed gull is one of five species identified in the citation as having nationally important populations which contribute to the Calf of Eday SPA breeding seabird assemblage.

1533. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA great black-backed gull population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that great black-backed gull is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1534. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Calf of Eday SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.14.4 Site Conclusion

1535. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Calf of Eday SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Calf of Eday SPA.

4.4.15 West Westray SPA

4.4.15.1 European Site Information and Conservation Objectives

1536. The West Westray SPA covers an area of 37.8 km² and comprises an 8 km length of red sandstone cliffs on the western coast of the island of Westray, off the north coast of Orkney Mainland, approximately 311 km from the Bellrock WFDA. The rocky cliff coastline and maritime vegetation support large colonies of breeding seabirds. Approximately 91% of the SPA is marine environment with a seaward extension extending approximately 2 km into the marine environment. The SPA was classified in 1996, with the marine extension classified in 2009.
1537. West Westray SPA qualifies under Article 4.1 by regularly supporting a population of European importance of one Annex I species, as well as under Article 4.2 by regularly supporting a population of European importance of one migratory species and by regularly supporting in excess of 20,000 breeding seabirds, including four species named only as component species (**Table 4.193**). The potential for LSE has been identified in relation to two of the six qualifying features or named components of the seabird assemblage feature (**Table 4.193**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1538. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

1539. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1540. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.194: Details on the Qualifying Features of the West Westray SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	113,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	23,900 pairs	Yes
Razorbill ¹	Breeding	Unfavourable declining	1,946 individuals	No
Guillemot	Breeding	Unfavourable, no change	42,150 individuals	No
Fulmar ¹	Breeding	Favourable maintained	1,400 pairs	No
Arctic skua ¹	Breeding	Unfavourable declining	78 pairs	Yes
Arctic tern	Breeding	Unfavourable declining	1,140 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.15.2 Assessment for the Kittiwake Population

1541. The West Westray SPA kittiwake population is currently estimated to number 2,755 AONs (taken to equate to 5,510 breeding individuals), based upon the most recently available count data for the entire SPA from 2017 (Burnell et al. 2023, JNCC and BTO, 2025). This represents a decline of more than 90% since the Seabirds 2000 census estimate of 34,864 AONs for the period 1998-2002. This decline means the SPA population size is now substantially below the citation level of 23,900 breeding pairs, with the SPA population having an 'unfavourable declining' condition status (Table 4.194).

4.4.15.2.1 The Potential for Impacts on the Kittiwake Population

1542. For the same reasons as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.1**), the main focus of the assessment for this SPA population is concerned with the Conservation Objective *'to maintain and restore the populations of the qualifying features ensure they are viable components of the SPA'*.
1543. At a distance of 311 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the West Westray SPA is just beyond the mean maximum plus one standard deviation of the breeding season foraging range for kittiwake, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). Consequently, there is deemed to be no breeding season connectivity with the Bellrock WFDA and, hence, no potential for breeding season impacts on the West Westray SPA kittiwake population.
1544. For the same reasons as detailed for the Buchan Ness to Collieston Coast SPA kittiwakes in **Section 4.4.1.2.1**, it is likely that there is the potential for birds from the West Westray SPA population to pass through OWFs in the North Sea during the autumn (post-breeding) and spring (pre-breeding) passage periods. The non-breeding apportioning calculations estimate that approximately 4% and 3% of the adult kittiwakes occurring on the Bellrock WFDA during the pre-breeding and post-breeding periods, respectively, derive from the West Westray SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**). Similarly, the apportioning calculations estimate 3% and 2% of the subadult kittiwakes occurring in the Bellrock WFDA during the pre- and post-breeding seasons, respectively, derive from the West Westray SPA. Kittiwakes are largely pelagic during the non-breeding period and so will travel on average much further than in the breeding season (Swindells, 2019). Consequently, the distance between Bellrock WFDA and the SPA is considerably less likely to affect the likelihood of kittiwakes from this SPA occurring in the Bellrock WFDA.
1545. Given the above, the Bellrock WFDA may have potential effects on West Westray SPA kittiwake population during non-breeding periods only. The different seasonal periods that are relevant to kittiwake are defined in **Section 4.4.1.2.1**.

4.4.15.2.2 Project Alone: Construction and Decommissioning

4.4.15.2.2.1 Disturbance

1546. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the West Westray SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the West Westray SPA is beyond the distance for breeding season connectivity and consequently, only non-breeding period impacts are being assessed.
1547. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.1**. On the basis of these details as applied to the West Westray SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA kittiwake population.

4.4.15.2.2.2 Displacement

1548. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the West Westray SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the West Westray SPA is beyond the distance for breeding season connectivity and consequently, only non-breeding period impacts are being assessed in this section.
1549. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.2**. On the basis of these details as applied to the West Westray SPA kittiwake population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA kittiwake population.

4.4.15.2.2.3 Changes to Prey Availability

1550. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the West Westray SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the West Westray SPA is beyond the distance for breeding season connectivity and consequently, only non-breeding period impacts are being assessed in this section.
1551. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.2.3**. On the basis of these details as applied to the West Westray SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the West Westray SPA kittiwake population.

4.4.15.2.3 *Project Alone: Operation and Maintenance*

4.4.15.2.3.1 Disturbance

1552. The assessment of the potential effects of disturbance during the O&M phase on the West Westray SPA kittiwake population is essentially as for the Buchan Ness to Collieston Coast SPA kittiwake population, noting that the West Westray SPA is beyond the distance for breeding season connectivity and consequently, only non-breeding period impacts are being assessed in this section. The details of the assessment of the potential effects of O&M phase disturbance on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.1**. On the basis of these details as applied to the West Westray SPA kittiwake population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the West Westray SPA kittiwake population.

4.4.15.2.3.2 Displacement/Barrier Effects

1553. The potential effects of displacement and barrier effects during the O&M phase on the West Westray SPA kittiwake population were assessed using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for kittiwake by NatureScot (2023d) were applied to the mean peak population sizes of kittiwake within the Bellrock WFDA and 2 km buffer for each

seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.195**). The resultant seasonal mortality estimates were then apportioned to the West Westray SPA and to the adult and subadult age classes, for non-breeding periods only, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.195**.

Table 4.195: Kittiwake Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the West Westray SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	314	0.943	0	0	0.1
Autumn passage	94	N/A	0.017	0.010	N/A
Spring passage	84	N/A	0.023	0.010	N/A

1554.

Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the West Westray SPA kittiwake population as a result of displacement is estimated to be 0.01 to 0.03 breeding adult birds and 0.01 to 0.02 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.196**). As detailed above, 100% of the potential mortality from displacement is predicted to occur during the non-breeding periods.

Table 4.196: Potential Annual Mortality of West Westray SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding ¹	30%	1%	0.000	0.000
	Autumn passage	30%	1%	0.005	0.003
	Spring passage	30%	1%	0.007	0.003
	Annual total	-	-	0.012	0.006
Upper mortality estimate	Breeding ¹	30%	3%	0.000	0.000
	Autumn passage	30%	3%	0.014	0.008
	Spring passage	30%	3%	0.018	0.008
	Annual total	-	-	0.032	0.016

¹Breeding season mortality is taken to be zero on the basis of there being no breeding season connectivity for this SPA

1555. The additional annual mortality of adult kittiwakes from the West Westray SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0006% (upper estimate) of the current adult breeding population at this colony (i.e. 5,510 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0.001% and 0.004%.
1556. Based upon the above, the potential levels of impact on the West Westray SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.15.2.3.3 Collision Risk

1557. The collision estimates for the West Westray SPA kittiwake population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the West Westray SPA and to the adult and subadult age classes for the non-breeding periods only. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1558. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.14 adult and 0.07 subadult birds (**Table 4.197**). As with the displacement effects, most of this mortality is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0003% of the current adult breeding population at this colony (i.e. 5,510 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.017%.

Table 4.197: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the West Westray SPA Kittiwake Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.000	0.000
Autumn passage	0.074	0.044
Spring passage	0.066	0.029
Annual total	0.140	0.073

1559. Based upon the above, the potential levels of impact on the West Westray SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.15.2.3.4 Combined Collisions and Displacement/Barrier Effects

1560. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.15 and 0.17 adult and 0.08 and 0.09 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0028% to 0.0031% of the current adult breeding population at this colony (i.e. 5,510 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.019% and 0.021%.
1561. Based upon the above, the potential levels of impact on the West Westray SPA kittiwake population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.15.2.3.5 Changes to Prey Availability

1562. The assessment of the potential effects of changes to prey availability during the O&M phase on the West Westray SPA kittiwake population, noting that the West Westray SPA is beyond the distance for breeding season connectivity and consequently, only non-breeding period impacts are being assessed in this section.

1563. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Buchan Ness to Collieston Coast SPA kittiwake population are presented in **Section 4.4.1.2.3.5**. On the basis of these details as applied to the West Westray SPA kittiwake population, it is considered that there is no potential for changes in prey availability during the O&M phase to lead to an adverse effect on the West Westray SPA kittiwake population.

4.4.15.2.4 *Project Alone Conclusion*

1564. The potential effects from the Bellrock Wind Farm Infrastructure alone on the West Westray SPA kittiwake population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents less than one fifth of an adult bird and only 0.003% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the West Westray SPA kittiwake population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.15.2.5 *Effects In-combination*

4.4.15.2.5.1 *Effects of Relevance to the In-combination Assessment*

1565. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the West Westray SPA kittiwake population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1566. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the West Westray SPA kittiwake population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.15.2.5.2 *Displacement/Barrier Effects – Operation and Maintenance*

1567. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the West Westray SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1568. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.196**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential

displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).

1569. Full details of the displacement mortality estimates for the West Westray SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.198**).

Table 4.198: Potential Annual Mortality of West Westray SPA Kittiwakes due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	8.98	4.57
	Upper mortality estimate	26.93	13.70
Including Berwick Bank Wind Farm	Lower mortality estimate	10.51	5.33
	Upper mortality estimate	31.54	15.98
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period.			

1570. The potential mortality on the SPA kittiwake population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from nine to 27 adult birds and five to 14 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 11 to 32 adults and five to 16 subadults (**Table 4.198**).
1571. In terms of the additional annual mortality of adult birds, these estimates represent 0.1629% (lower estimate) to 0.4887% (upper estimate) of the current adult breeding population at this colony (i.e. 5,510 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1908% (lower estimate) to 0.5723% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline

mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.116% to 3.347% (with the Berwick Bank Wind Farm effects excluded) and 1.307% to 3.920% (with the Berwick Bank Wind Farm effects included).

1572. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.199: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	25,461	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	24,152	1.0325	0.9986	0.9494	45.14
	Upper mortality estimate	21,715	1.0295	0.9957	0.8565	35.18
Including Berwick Bank	Lower mortality estimate	23,885	1.0322	0.9983	0.9415	44.30
	Upper mortality estimate	21,147	1.0288	0.9950	0.8339	32.92

1573. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the West Westray SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value for the upper mortality estimate indicates a reduction of 14% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.43% (**Table 4.199**). The metrics for the lower mortality estimates indicate reductions of 5% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.14% in the annual population growth rate.

1574. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2, Section 4.4.1.2.5.3 and Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the West Westray SPA kittiwake population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 14% and 5% for the upper and lower mortality estimates, respectively (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1575. The potential levels of impact on the West Westray SPA kittiwake population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered sufficient to mean that the potential for an adverse effect on the SPA population cannot be excluded. For the same reasons as set in greater detail in the In-combination conclusion below (**Section 4.4.15.2.6**), this conclusion is reached by considering these impacts within the context of the marked decline in the population, which is now considerably below the citation level (**Section 4.4.15.1, Table 4.194**). However, as is also detailed in **Section 4.4.15.2.6**, it is considered that the Bellrock WFDA alone makes no meaningful contribution to the in-combination impacts.

4.4.15.2.5.3 Collision Risk – Operation and Maintenance

1576. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the West Westray SPA kittiwake population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1577. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm.
1578. Full details of the collision estimates for the West Westray SPA kittiwake population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.200**).

Table 4.200: Potential Annual Mortality of West Westray SPA Kittiwakes due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	30.93	15.65
Including Berwick Bank Wind Farm	36.34	18.39

1579. The potential mortality on the SPA kittiwake population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality ranges from 31 to 36 adult birds and 16 to 18 subadult birds, according to whether the Berwick Bank Wind Farm collision estimates are included or excluded (**Table 4.200**).
1580. In terms of the additional annual mortality of adult birds, these estimates represent 0.5614% (Berwick Bank excluded) to 0.6595% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 5,510 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, these collision estimates represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 3.845% (Berwick Bank excluded) to 4.517% (Berwick Bank included).
1581. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.201: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	25,461	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	21,258	1.0289	0.9951	0.8369	33.22
Including Berwick Bank	20,566	1.0279	0.9942	0.8108	30.12

1582. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the West Westray SPA kittiwake population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The CPS value indicates a reduction of 16% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is only 0.49% (**Table 4.201**).
1583. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.1.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, which indicated a reduction of 16% in the size of the SPA population at the end of the projection period relative to the population size predicted to occur in the absence of any wind farm effects (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1584. The potential levels of impact on the West Westray SPA kittiwake population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered sufficient to mean that the potential for an adverse effect on the SPA population cannot be excluded. For the same reasons as set in greater detail in the In-combination conclusion below (**Section 4.4.15.2.6**, this conclusion is reached by considering these impacts within the context of the marked decline in the population, which is now considerably below the citation level (**Section 4.4.15.1, Table 4.194**). However, as is also detailed in **Section 4.4.15.2.6**, it is considered that the Bellrock WFDA alone makes no meaningful contribution to the in-combination impacts.

4.4.15.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1585. The potential mortality attributed to the West Westray SPA kittiwake population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.202**. These estimates are derived

from the displacement and collision mortality estimates presented in **Section 4.4.2.2.5.2** and **Section 4.4.2.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.202: Potential Annual Mortality of West Westray SPA Kittiwakes due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	39.91	20.22
	Upper mortality estimate	57.86	29.35
Including Berwick Bank Wind Farm	Lower mortality estimate	46.85	23.71
	Upper mortality estimate	67.88	34.37
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 30% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.198 and Table 4.200 due to rounding errors.			

1586. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA kittiwake population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 40 to 58 breeding adult birds and 20 to 29 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 47 to 68 adults and 24 to 34 subadults. These estimates represent 0.7243% (lower estimate) to 1.0500% (upper estimate) of the current adult breeding population at this colony (i.e. 5,510 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.8503% (lower estimate) to 1.2319% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.146 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 4.961% to 7.192% (with the Berwick Bank Wind Farm effects excluded) and 5.824% to 8.437% (with the Berwick Bank Wind Farm effects included).

1587. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.203** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population**

Viability Technical Report (Volume IV)). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 28% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.92% (**Table 4.203**). The metrics for the lower mortality estimates indicate reductions of 21% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.63% in the annual population growth rate.

Table 4.203: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the West Westray SPA Kittiwake Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	25,461	1.0339	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	20,114	1.0274	0.9937	0.7946	28.28
	Upper mortality estimate	18,188	1.0243	0.9908	0.7168	21.14
Including Berwick Bank	Lower mortality estimate	19,419	1.0261	0.9926	0.7638	25.74
	Upper mortality estimate	17,178	1.0228	0.9892	0.6764	16.92

1588. As for the PVAs detailed in **Section 4.4.2.2.5.2** and **Section 4.4.2.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 28% for the upper mortality estimate and reduced to 20% for the lower mortality estimates (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.15.2.6 In-combination Conclusion

1589. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the West Westray SPA kittiwake population is predicted to cause the population to be up to 28% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with

the Berwick Bank Wind Farm is excluded from the in-combination effects because the consent is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the West Westray SPA kittiwakes) for which the potential for an adverse effect was concluded (Marine Directorate, 2025). It is anticipated that the recently submitted projects which are identified as contributing to this in-combination impact, and which provided a Derogation Case in support of their consent application, will also have to provide compensation, which will lead to a reduction in the scale of the impact as predicted in this assessment. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.15.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (less than one fifth of an adult bird, representing only 0.003% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1590. Considering the scale of the potential reduction in the size of the SPA population associated with the in-combination effects within the context of the marked, long term, decline of the West Westray SPA kittiwake population, the current small size of the population and its 'unfavourable declining' condition status (**Table 4.194**), it is concluded that the possibility of an adverse effect on the SPA population cannot be excluded. This conclusion is reached in relation to the combined displacement and collision mortality but also in relation to each of the potential displacement mortality and collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects when these effect pathways are considered separately. However, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
1591. As has been outlined in **Section 4.2.2**, it is important to consider this conclusion within the context of the precautionary assumptions incorporated into the assessment of SPA kittiwake populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.15.3 Assessment for the Breeding Seabird Assemblage

1592. The breeding seabird assemblage for the West Westray SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation also noting that the SPA regularly supports 113,000 individual seabirds). Kittiwake is one of the six species identified in the citation as having populations which are considered to be of European or national importance and which contribute to the West Westray SPA breeding seabird assemblage.
1593. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. In relation to the SPA kittiwake population, no potential for an adverse effect is identified for the Bellrock Wind Farm Infrastructure alone and it is also concluded that the effects from the Bellrock Wind Farm Infrastructure alone are so small as to represent no meaningful contribution to the in-combination effects, but noting that if the assessment for the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is undertaken, the potential for an adverse effect is identified for the SPA kittiwake population. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect. Therefore, kittiwake is the only named component of the breeding seabird assemblage qualifying feature

which has been taken forward to Phase Two of the HRA but, as stated above, no potential for an adverse effect is identified for kittiwake.

1594. Given the above, it is concluded that there is no potential for an adverse effect on the SPA seabird assemblage in relation to the Bellrock WFDA alone or in-combination with other plans and projects. This conclusion would change if the in-combination impacts on the SPA kittiwake population were considered to represent a potential adverse effect. The West Westray SPA kittiwake population is currently estimated to number 2,755 AON. It is considered that the scale of the potential in-combination impacts, in conjunction with the small size and marked decline of this population, is sufficient to represent an increased risk of this population being lost from the breeding seabird assemblage. However, as stated above, in relation to the SPA kittiwake population, it is considered that the effects from the Bellrock Wind Farm Infrastructure alone represent no meaningful addition to the in-combination effects from the other plans and projects.

4.4.15.4 Site Conclusion

1595. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the West Westray SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the West Westray SPA.

4.4.16 Sule Skerry and Sule Stack SPA

4.4.16.1 European Site Information and Conservation Objectives

1596. Sule Skerry and Sule Stack are isolated islets 60 km west of Mainland, Orkney, approximately 346 km from the Bellrock WFDA. Sule Skerry is larger, low-lying and vegetated whereas Sule Stack is a higher, bare rock, stack. The boundary of the SPA overlaps with those of Sule Skerry SSSI and Sule Stack SSSI and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1994, with the marine extension classified in 2009.
1597. Sule Skerry and Sule Stack SPA qualifies under Article 4.1 by regularly supporting populations of European importance of two Annex I species, as well as under Article 4.2 by regularly supporting populations of European importance of two migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including two species named only as component species (**Table 4.204**). The potential for LSE has been identified in relation to one of the six qualifying features (**Table 4.204**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1598. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;

- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

1599. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1600. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.204: Details on the Qualifying Features of the Sule Skerry and Sule Stack SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	100,000 individuals	Yes
Guillemot ¹	Breeding	Favourable maintained	6,298 pairs	No
Puffin	Breeding	Favourable maintained	46,900 pairs	No
European storm petrel	Breeding	Unfavourable declining	5,000 pairs	No
Leach's storm petrel	Breeding	Unfavourable, no change	5 pairs	No
Gannet	Breeding	Favourable maintained	5,900 pairs	Yes
Shag ¹	Breeding	Unfavourable declining	874 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.16.2 Assessment for the Gannet Population

1601. The Sule Skerry and Sule Stack SPA gannet population is currently estimated to number 7,824 AOS (which is taken to equate to 15,648 individuals), based upon the most recently available count data from 2013 (for Sule Stack) and 2024 (for Sule Skerry) (JNCC and BTO, 2025). This represents a decline from the 9,065 AOS estimated from the Seabirds Count census, which was based upon the 2013 count for Sule Stack and a 2018 count for Sule Skerry (Burnell et al. 2023, JNCC and BTO, 2025). This recent decline can be attributed to the HPAI outbreak in 2022 and it is possible that the extent of decline across the SPA could be greater than documented if there has also been a decline on Sule Stack. Prior to the HPAI outbreak, the SPA population had shown marked increases, with the estimate from the Seabirds Count census representing a 94% increase from the Seabird 2000 census estimate (for the period 2018-2022) (Burnell et al. 2023). Although

numbers on Sule Stack appear to have been relatively constant since the early 1900s, numbers on Sule Skerry have increased markedly since the establishment of this colony in the early 2000s (Murray et al. 2015).

1602. Consequently, the SPA population size remains considerably above the citation level of 5,900 pairs and has 'favourable maintained' condition status (**Table 4.204**).

4.4.16.2.1 The Potential for Impacts on the Gannet Population

1603. The Bellrock WFDA plus 2 km buffer does not overlap with the Sule Skerry and Sule Stack SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this qualifying feature is concerned with the Conservation Objective to ensure *the populations of the qualifying features are viable components of the SPA*.
1604. At a distance of 359 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Sule Skerry and Sule Stack SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity, and is also within the mean (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Sule Skerry and Sule Stack SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with tracked birds from the Sule Skerry and Sule Stack SPA remaining far from the Bellrock WFDA which is encompassed by the foraging ranges of birds from the Forth islands SPA population (Wakefield et al. 2013).
1605. The apportioning calculations estimate that approximately 2% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this is likely to be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.
1606. Gannets from the Sule Skerry and Sule Stack SPA move south in autumn to winter in more southern waters, returning north in the spring. A proportion of the gannets from this SPA are considered to use routes that take them through the North Sea during autumn passage, but they are not considered to take such routes on the return migration in spring (when all birds are assumed to use westerly routes) (Furness, 2015). As such, there is a possibility that birds from the SPA population may pass through the Bellrock WFDA and two-kilometre buffer in the autumn (but not spring) passage period. The non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).

1607. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the Sule Skerry and Sule Stack SPA gannet population to occur during breeding and non-breeding periods.

4.4.16.2.2 Project Alone: Construction and Decommissioning

4.4.16.2.2.1 Disturbance

1608. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Sule Skerry and Sule Stack SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Sule Skerry and Sule Stack SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.16.2.1**, see also Wakefield et al. 2013).
1609. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.1**. On the basis of these details as applied to the Sule Skerry and Sule Stack SPA gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Sule Skerry and Sule Stack SPA gannet population.

4.4.16.2.2.2 Displacement

1610. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Sule Skerry and Sule Stack SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Sule Skerry and Sule Stack SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.16.2.1**, see also Wakefield et al. 2013).
1611. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.2**. On the basis of these details as applied to the Sule Skerry and Sule Stack SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Sule Skerry and Sule Stack SPA gannet population.

4.4.16.2.2.3 Changes to Prey Availability

1612. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Sule Skerry and Sule Stack SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Sule Skerry and Sule Stack SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.16.2.1**, see also Wakefield et al. 2013).
1613. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.2.3**. On the basis of these details as applied to the Sule Skerry and Sule Stack SPA gannet population, it is considered that there is no potential for changes in prey

availability during the construction or decommissioning phases to lead to an adverse effect on the Sule Skerry and Sule Stack SPA gannet population.

4.4.16.2.3 *Project Alone: Operation and Maintenance*

4.4.16.2.3.1 Disturbance

1614. The assessment of the potential effects of disturbance during the O&M phase on the Sule Skerry and Sule Stack SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Sule Skerry and Sule Stack SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.16.2.1**, see also Wakefield et al. 2013).
1615. The details of the assessment of the potential effects of O&M phase disturbance on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the Sule Skerry and Sule Stack SPA gannet population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Sule Skerry and Sule Stack SPA gannet population.

4.4.16.2.3.2 Displacement/Barrier Effects

1616. The potential effects of displacement and barrier effects during the O&M phase on the Sule Skerry and Sule Stack SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.205**). The resultant seasonal mortality estimates were then apportioned to the Sule Skerry and Sule Stack SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.205**.

Table 4.205: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Sule Skerry and Sule Stack SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.019	0.019	0.10
Autumn passage	224	N/A	0.002	0.003	N/A
Spring passage	159	N/A	0.000	0.000	N/A

1617. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Sule Skerry and Sule Stack SPA gannet population as a result of displacement is estimated to

be 0.03 to 0.01 breeding adult birds and 0.01 to 0.02 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.206**). Approximately 78% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.206: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.030	0.001
	Autumn passage	70%	1%	0.003	0.005
	Spring passage	70%	1%	0.000	0.000
	Annual total	-	-	0.033	0.006
Upper mortality estimate	Breeding	70%	3%	0.090	0.003
	Autumn passage	70%	3%	0.010	0.016
	Spring passage	70%	3%	0.000	0.000
	Annual total	-	-	0.099	0.018

1618. The additional annual mortality of adult gannets from the Sule Skerry and Sule Stack SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0006% (upper estimate) of the current adult breeding population at this colony (i.e. 15,648 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.003% and 0.008%.

1619. Based upon the above, the potential levels of impact on the Sule Skerry and Sule Stack SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.16.2.3.3 Collision Risk

1620. The collision estimates for the Sule Skerry and Sule Stack SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth

Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Sule Skerry and Sule Stack SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

1621. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.25 adult and 0.02 subadult birds (**Table 4.207**). In contrast to the displacement effects, most of this mortality (i.e. 95%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0016% of the current adult breeding population at this colony (i.e. 15,648 individuals) (**Table 2.3 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see **Table 2.12 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.020%.

Table 4.207: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Sule Skerry and Sule Stack SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.246	0.008
Autumn passage	0.005	0.008
Spring passage	0.000	0.000
Annual total	0.251	0.016

1622. Based upon the above, the potential levels of impact on the Sule Skerry and Sule Stack SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.16.2.3.4 Combined Collisions and Displacement/Barrier Effects

1623. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.28 and 0.35 adult and 0.02 and 0.03 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This

potential additional mortality of adult birds represents 0.0018% to 0.0022% of the current adult breeding population at this colony (i.e. 15,648 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.022% and 0.027%.

1624. Based upon the above, the potential levels of impact on the Sule Skerry and Sule Stack SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.16.2.3.5 Changes to Prey Availability

1625. The assessment of the potential effects of changes to prey availability during the O&M phase on the Sule Skerry and Sule Stack SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Sule Skerry and Sule Stack SPA is further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.16.2.1**, see also Wakefield et al. 2013).
1626. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Sule Skerry and Sule Stack SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Sule Skerry and Sule Stack SPA gannet population.

4.4.16.2.4 Project Alone Conclusion

1627. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Sule Skerry and Sule Stack SPA gannet population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents approximately one third of an adult bird and only 0.002% of the SPA population (with this population having increased over the long-term), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Sule Skerry and Sule Stack SPA gannet population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.16.2.5 *Effects In-combination*

4.4.16.2.5.1 Effects of Relevance to the In-combination Assessment

1628. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Sule Skerry and Sule Stack SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1629. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the Sule Skerry and Sule Stack SPA gannet population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.16.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1630. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Sule Skerry and Sule Stack SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1631. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (Table 4.206), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1632. Full details of the displacement mortality estimates for the Sule Skerry and Sule Stack SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.208**).

Table 4.208: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	4.87	3.71
	Upper mortality estimate	14.60	11.14
Including Berwick Bank Wind Farm	Lower mortality estimate	5.00	3.74
	Upper mortality estimate	15.00	11.23
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1633. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects included, the potential mortality ranges from five to 15 breeding adult birds and four to 11 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (noting that the exclusion of Berwick bank has little effect on the potential mortality) (**Table 4.208**).
1634. In terms of the additional annual mortality of adult birds, these estimates represent 0.0311% (lower estimate) to 0.0933% (upper estimate) of the current adult breeding population at this colony (i.e. 15,648 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0320% (lower estimate) to 0.0959% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.384% to 1.152% (with the Berwick Bank Wind Farm effects excluded) and 0.395% to 1.184% (with the Berwick Bank Wind Farm effects included).
1635. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was

undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.209: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	20,266	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	19,998	1.0058	0.9996	0.9871	47.54
	Upper mortality estimate	19,510	1.0051	0.9989	0.9623	43.22
Including Berwick Bank	Lower mortality estimate	20,029	1.0057	0.9996	0.9869	47.72
	Upper mortality estimate	19,496	1.0050	0.9989	0.9617	43.00

1636. No adverse effect on the Sule Skerry and Sule Stack SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The CPS value for the upper mortality estimate for this in-combination scenario indicates a reduction of 4% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.11% (**Table 4.209**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.04% in the annual population growth rate.

1637. As for the PVAs for the Forth Islands SPA gannet population (**Section 4.4.5.5.2**, **Section 4.4.5.5.3** and **Section 4.4.5.5.4**), the additional PVAs for the displacement mortality to the Sule Skerry and Sule Stack SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact as measured by the CPS values, although the CPGR values remained

unchanged compared to those for the 35-year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 4% and 1% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1638. Given the marked increase in the Sule Skerry and Sule Stack SPA gannet population over the past two decades (even when accounting for the recent decline following the HPAI outbreak in 2022) and the fact that it remains considerably above the citation population size, it is considered that these small levels of impact would not result in an adverse effect on the SPA population.

4.4.16.2.5.3 Collision Risk – Operation and Maintenance

1639. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Sule Skerry and Sule Stack SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1640. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. As stated in **Section 4.4.1.2.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1641. Full details of the collision estimates for the Sule Skerry and Sule Stack SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.210**).

Table 4.210: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	20.03	16.97
Including Berwick Bank Wind Farm	20.41	16.98

1642. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one to

two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is 20 breeding adult birds and 17 subadult birds with the Berwick Bank Wind Farm collision estimate included (noting that exclusion of the Berwick Bank Wind Farm estimate has little effect on the potential mortality) (**Table 4.210**).

1643. In terms of the additional annual mortality of adult birds, these estimates represent 0.1280% to 0.1304% of the current adult breeding population at this colony (i.e. 15,648 individuals) depending on whether Berwick Bank is included or not (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. This represents an increase in baseline mortality levels (i.e. without any wind farm impacts) which exceeds the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.58% (Berwick Bank excluded) to 1.61% (Berwick Bank included).

1644. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.211: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	20,266	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	19,194	1.0046	0.9985	0.9467	39.98
Including Berwick Bank	19,187	1.0046	0.9985	0.9461	39.86

1645. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Sule Skerry and Sule Stack SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the

absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.15% (**Table 4.211**).

1646. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.16.2.5.2**), the additional PVAs for the collision mortality to the Sule Skerry and Sule Stack SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 5% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1647. Given the marked increase in the Sule Skerry and Sule Stack SPA gannet population over the past two decades (even when accounting for the recent decline following the HPAI outbreak in 2022) and the fact that it remains considerably above the citation population size, it is considered that these small levels of impact would not result in an adverse effect on the SPA population.

4.4.16.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1648. The potential mortality attributed to the Sule Skerry and Sule Stack SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.212**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.16.2.5.2** and **Section 4.4.16.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.212: Potential Annual Mortality of Sule Skerry and Sule Stack SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	24.90	20.68
	Upper mortality estimate	34.63	28.11
Including Berwick Bank Wind Farm	Lower mortality estimate	25.41	20.72
	Upper mortality estimate	35.41	28.21
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.208 and (Table 4.210). Table 4.210 due to rounding errors.			

1649. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 25 to 35 breeding adult birds and 21 to 28 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The inclusion of Berwick Bank shows little effect on the potential mortality, with the estimates rounding to whole numbers equivalent to the above. These estimates represent 0.1591% (lower estimate) to 0.2213% (upper estimate) of the current adult breeding population at this colony (i.e. 15,648 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.1624% (lower estimate) to 0.2263% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.964% to 2.732% (with the Berwick Bank Wind Farm effects excluded) and 2.005% to 2.794% (with the Berwick Bank Wind Farm effects included).
1650. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.212** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 9% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.26% (**Table 4.213**). The metrics for the lower mortality estimates indicate reductions of 7% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.19% in the annual population growth rate.

Table 4.213: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Sule Skerry and Sule Stack SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	20,266	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	18,934	1.0042	0.9981	0.9342	37.68
	Upper mortality estimate	18,446	1.0034	0.9974	0.9103	33.46
Including Berwick Bank	Lower mortality estimate	18,913	1.0042	0.9981	0.9334	37.50
	Upper mortality estimate	18,422	1.0035	0.9974	0.9094	33.34

1651. As for the PVAs detailed in **Section 4.4.16.2.5.2** and **Section 4.4.16.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 9% and 7% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.16.2.6 In-combination Conclusion

1652. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Sule Skerry and Sule Stack SPA gannet population is predicted to result in the population being up to 9% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 0.26%. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.16.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (approximately one third of an adult bird, representing only 0.002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1653. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has shown a considerable increase in numbers over a period of more than two decades up until the HPAI

outbreak in 2022, following which there has been a modest decline. Despite the recent decline, the SPA population size remains well above the citation level and has a 'favourable maintained' condition status (**Table 4.204**). Given this, it is concluded that there is no potential for an adverse effect on the Sule Skerry and Sule Stack SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.

1654. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.16.3 Assessment for the Breeding Seabird Assemblage

1655. The breeding seabird assemblage for the Sule Skerry and Sule Stack SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 100,000 individual seabirds). Gannet is one of six species identified in the citation as having nationally important populations which contribute to the Sule Skerry and Sule Stack SPA breeding seabird assemblage.
1656. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA gannet population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA gannet population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that gannet is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1657. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Sule Skerry and Sule Stack SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.16.4 Site Conclusion

1658. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Sule Skerry and Sule Stack SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Sule Skerry and Sule Stack SPA.

4.4.17 Noss SPA

4.4.17.1 European Site Information and Conservation Objectives

1659. Noss is an offshore island lying 5 km east of Lerwick, Shetland, approximately 360 km from the Bellrock WFDA. The boundary of the SPA overlaps that of the Noss SSSI and NNR and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 1996, with the marine extension classified in 2009.
1660. Noss SPA qualifies under Article 4.2 by regularly supporting populations of European importance of three migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including three species named only as component species (**Table 4.214**). The potential for LSE has been identified in relation to one of the six qualifying species (**Table 4.214**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1661. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1662. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1663. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.214: Details on the Qualifying Features of the Noss SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	35,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	7,020 pairs	No

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Great skua	Breeding	Unfavourable declining	420 pairs	No
Guillemot	Breeding	Unfavourable, no change	38,970 individuals	No
Puffin ¹	Breeding	Unfavourable declining	2,348 individuals	No
Fulmar ¹	Breeding	Unfavourable, no change	6,350 pairs	No
Gannet	Breeding	Favourable maintained	6,860 pairs	Yes
Notes:				
¹ Named component of the assemblage only.				

4.4.17.2 Assessment for the Gannet Population

1664. The Noss SPA gannet population is currently estimated to number 12,335 AON (which is taken to equate to 24,670 individuals), based upon the most recently available count data from 2023 (JNCC and BTO, 2025). This represents a decline from the estimate of 13,765 AON for 2018, which is attributable to the HPAI outbreak in 2022 (Burnell et al. 2023, Tremlett et al. 2024, JNCC and BTO, 2025). Prior to the HPAI outbreak, the SPA population had been increasing since the 1930s, albeit at a slower rate than many other Scottish gannet colonies, with the numbers of AON estimated as 7,218 in 1989 and 8,017 in 1999 (Murray et al. 2015, JNCC and BTO, 2025). The SPA population size remains considerably above the citation level of 6,860 pairs and has 'favourable maintained' condition status (**Table 4.214**).

4.4.17.2.1 The Potential for Impacts on the Gannet Population

1665. The Bellrock WFDA plus two-kilometre buffer does not overlap with the Noss SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this qualifying feature is concerned with the Conservation Objective to ensure *the populations of the qualifying features are viable components of the SPA*.
1666. At a distance of 361 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Noss SPA is well within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity, and is also within the mean (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Noss SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Wakefield et al. 2013).

1667. The apportioning calculations estimate that approximately 3% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this is likely to be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.
1668. Gannets from the Noss SPA move south in autumn to winter in more southern waters, returning north in the spring, with the passage movements during both periods involving routes which mean that birds from the SPA population may pass through the Bellrock WFDA and two-kilometre buffer (Furness, 2015). Thus, the non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1669. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the Noss SPA gannet population to occur during breeding and non-breeding periods.

4.4.17.2.2 Project Alone: Construction and Decommissioning

4.4.17.2.2.1 Disturbance

1670. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Noss SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Noss SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.17.2.1**, see also Wakefield et al. 2013).
1671. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.1**. On the basis of these details as applied to the Noss SPA gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Noss SPA gannet population.

4.4.17.2.2.2 Displacement

1672. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Noss SPA gannet population is essentially as for the Forth Islands SPA gannet population, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.17.2.1**, see also Wakefield et al. 2013).
1673. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the Noss SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Noss SPA gannet population.

4.4.17.2.2.3 Changes to Prey Availability

1674. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Noss SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Noss SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.17.2.1**, see also Wakefield et al. 2013).
1675. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Noss SPA gannet population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Noss SPA gannet population.

4.4.17.2.3 *Project Alone: Operation and Maintenance*

4.4.17.2.3.1 Disturbance

1676. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Noss SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Noss SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.17.2.1**, see also Wakefield et al. 2013).
1677. The details of the assessment of the potential effects of O&M phase disturbance on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the Noss SPA gannet population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the Noss SPA gannet population.

4.4.17.2.3.2 Displacement/Barrier Effects

1678. The potential effects of displacement and barrier effects during the O&M phase on the Noss SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.215**). The resultant seasonal mortality estimates were then apportioned to the Noss SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.215**.

Table 4.215: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Noss SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.029	0.029	0.10
Autumn passage	224	N/A	0.034	0.028	N/A
Spring passage	159	N/A	0.055	0.025	N/A

1679. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Noss SPA gannet population as a result of displacement is estimated to be 0.16 to 0.48 breeding adult birds and 0.07 to 0.22 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.216**). Approximately 20% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.216: Potential Annual Mortality of Noss SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.046	0.001
	Autumn passage	70%	1%	0.055	0.044
	Spring passage	70%	1%	0.061	0.028
	Annual total	-	-	0.161	0.074
Upper mortality estimate	Breeding	70%	3%	0.137	0.004
	Autumn passage	70%	3%	0.161	0.130
	Spring passage	70%	3%	0.182	0.084
	Annual total	-	-	0.480	0.219

1680. The additional annual mortality of adult gannets from the Noss SPA population predicted due to displacement from the Bellrock WFDA represents 0.0007% (lower estimate) to 0.0019% (upper estimate) of the current adult breeding population at this colony (i.e. 24,670 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which

is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.008% and 0.024%. Based upon the above, the potential levels of impact on the Noss SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.17.2.3.3 Collision Risk

1681. The collision estimates for the Noss SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Noss SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1682. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.49 adult and 0.10 subadult birds (**Table 4.217**). In contrast to the displacement effects, a large proportion of this mortality (i.e. 66%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0020% of the current adult breeding population at this colony (i.e. 24,670 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.024%.

Table 4.217: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Noss SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.375	0.012
Autumn passage	0.084	0.068
Spring passage	0.033	0.015
Annual total	0.492	0.095

1683. Based upon the above, the potential levels of impact on the Noss SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.17.2.3.4 Combined Collisions and Displacement/Barrier Effects

1684. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.65 and 0.97 adult and 0.17 and 0.31 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0026% to 0.0039% of the current adult breeding population at this colony (i.e. 24,670 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.033% and 0.049%.
1685. Based upon the above, the potential levels of impact on the Noss SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.17.2.3.5 Changes to Prey Availability

1686. The assessment of the potential effects of changes to prey availability during the O&M phase on the Noss SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Noss SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.17.2.1**, see also Wakefield et al. 2013).
1687. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Noss SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Noss SPA gannet population.

4.4.17.2.4 Project Alone Conclusion

1688. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Noss SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.17.2.5 *Effects In-combination*

4.4.17.2.5.1 *Effects of Relevance to the In-combination Assessment*

1689. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Noss SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1690. Therefore, the potential for effects of the Bellrock WFDA to act on the Noss SPA gannet population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.17.2.5.2 *Displacement/Barrier Effects – Operation and Maintenance*

1691. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Noss SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.2**). This was as agreed by NatureScot. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.216**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1692. Full details of the displacement mortality estimates for the Noss SPA gannet population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.218**).

Table 4.218: Potential Annual Mortality of Noss SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	10.00	7.88
	Upper mortality estimate	30.00	23.63
Including Berwick Bank Wind Farm	Lower mortality estimate	10.50	8.20
	Upper mortality estimate	31.50	24.61
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1693. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 10 to 30 breeding adult birds and eight to 24 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 11 to 32 adults and eight to 25 subadults (**Table 4.218**).
1694. In terms of the additional annual mortality of adult birds, these estimates represent 0.041% (lower estimate) to 0.122% (upper estimate) of the current adult breeding population at this colony (i.e. 24,670 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.043% (lower estimate) to 0.128% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see **Table 2.12 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.500% to 1.501% (with the Berwick Bank Wind Farm effects excluded) and 0.525% to 1.576% (with the Berwick Bank Wind Farm effects included).
1695. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm

Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.219: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	32,240	1.0063	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	31,698	1.0058	0.9995	0.9831	47.16
	Upper mortality estimate	30,603	1.0048	0.9986	0.9502	40.96
Including Berwick Bank	Lower mortality estimate	31,665	1.0058	0.9995	0.9821	46.98
	Upper mortality estimate	30,521	1.0047	0.9985	0.9483	40.50

1696. No adverse effect on the Noss SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The CPS value for the upper mortality estimate for this in-combination scenario indicates a reduction of 5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.14% (**Table 4.219**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.05% in the annual population growth rate.
1697. As for the PVAs for the Forth Islands SPA gannet population (**Section 4.4.5.5.2**, **Section 4.4.5.5.3** and **Section 4.4.5.5.4**), the additional PVAs for the displacement mortality to the Noss SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact as measured by the CPS values, although the CPGR values remained relatively unchanged

compared to those for the 35-year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) is predicted at 5% and 2% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1698. Given the long-term, and sustained, increase in the Noss SPA gannet population (even when accounting for the recent decline following the HPAI outbreak in 2022) and the fact that it remains considerably above the citation population size, it is considered that these small levels of impact would not result in an adverse effect on the SPA population.

4.4.17.2.5.3 Collision Risk – Operation and Maintenance

1699. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Noss SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1700. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.5.5.5.3** for the Forth Islands SPA gannet population. As stated in **Section 4.4.5.5.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1701. Full details of the collision estimates for the Noss SPA gannet population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.220**).

Table 4.220: Potential Annual Mortality of Noss SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	8.46	5.17
Including Berwick Bank Wind Farm	9.05	5.29

1702. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of

magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is nine breeding adult birds and five subadult birds with the Berwick Bank Wind Farm collision estimate included (noting that exclusion of the Berwick Bank Wind Farm estimate has little effect on the potential mortality) (**Table 4.220**).

1703. In terms of the additional annual mortality of adult birds, these estimates represent 0.0343% (Berwick Bank excluded) to 0.0367% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 24,670 individuals) (**Table 2.6 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. This represents an increase in baseline mortality levels (i.e. without any wind farm impacts) which exceeds the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see **Table 2.12 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.423% (Berwick Bank excluded) to 0.453% (Berwick Bank included).

1704. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.221: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	32,240	1.0063	N/A	N/A	N/A
Excluding Berwick Bank	31,794	1.0058	0.9996	0.9871	47.76
Including Berwick Bank	31,801	1.0059	0.9996	0.9863	47.80

1705. For the reasons given in **Section 4.4.17.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm because no adverse effect on the Noss SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). The CPS value for the predicted mortality for this in-combination scenario indicates a reduction of 1% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of

any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.04% (**Table 4.221**).

1706. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.17.2.5.2**), the additional PVAs for the collision mortality to the Noss SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 1% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1707. Given the marked increase in the Noss SPA gannet population over the past three decades (even when accounting for the recent decline following the HPAI outbreak in 2022) and the fact that it remains considerably above the citation population size, it is considered that these small (and inconsequential) levels of impact would not result in an adverse effect on the SPA population.

4.4.17.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1708. The potential mortality attributed to the Noss SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.222**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.17.2.5.2** and **Section 4.4.17.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.222: Potential Annual Mortality of Noss SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	18.46	13.05
	Upper mortality estimate	38.46	28.81
Including Berwick Bank Wind Farm	Lower mortality estimate	19.55	13.50
	Upper mortality estimate	40.54	29.90
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.218 and Table 4.220 due to rounding errors.			

1709. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 18 to 38 breeding adult birds and 13 to 29 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 20 to 41 adults and 14 to 30 subadults. These estimates represent 0.0748% (lower estimate) to 0.1559% (upper estimate) of the current adult breeding population at this colony (i.e. 24,670 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0792% (lower estimate) to 0.1643% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.924% to 1.925% (with the Berwick Bank Wind Farm effects excluded) and 0.978% to 2.029% (with the Berwick Bank Wind Farm effects included).
1710. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.223** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.4.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 6% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.19% (**Table 4.223**). The metrics for the lower mortality estimates indicate reductions of 3% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.09% in the annual population growth rate.

Table 4.223: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Noss SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	32,240	1.0063	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	31,264	1.0054	0.9992	0.9702	44.64
	Upper mortality estimate	30,196	1.0044	0.9982	0.9378	38.38
Including Berwick Bank	Lower mortality estimate	31,187	1.0054	0.9991	0.9694	44.12
	Upper mortality estimate	30,141	1.0044	0.9981	0.9353	38.24

1711. As for the PVAs detailed in **Section 4.4.17.2.5.2** and **Section 4.4.17.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 6% and 3% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.17.2.6 In-combination Conclusion

1712. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Noss SPA gannet population is predicted to result in the population being up to 6% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 0.19%.
1713. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has increased over the long-term, with a near doubling in numbers between the 1980s and 2018, although there has been a modest decline following the HPAI outbreak in 2022. Despite the recent decline, the SPA population size remains well above the citation level and has a 'favourable maintained' condition status (**Table 4.214**). Given this, it is concluded that there is no potential for an adverse effect on the Noss SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects.

1714. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.17.3 Assessment for the Breeding Seabird Assemblage

1715. The breeding seabird assemblage for the Noss SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 35,000 individual seabirds). Gannet is one of six species identified in the citation as having nationally important populations which contribute to the Noss SPA breeding seabird assemblage.
1716. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA gannet population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that gannet is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1717. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Noss SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.17.4 Site Conclusion

1718. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Noss SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Noss SPA.

4.4.18 North Rona and Sula Sgeir SPA

4.4.18.1 European Site Information and Conservation Objectives

1719. The uninhabited islands of North Rona and Sula Sgeir, together with several outlying rocky islets and adjacent waters, lie 65 km north of Lewis and approximately 408 km from the Bellrock WFDA. The coastlines of both islands consist mainly of cliffs except for two low-lying peninsulas on North Rona. Sula Sgeir lies about 15 km west of North Rona. The boundary of the SPA overlaps with the boundary of the North Rona and Sula Sgeir SSSI, and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 2001, with the marine extension classified in 2009.
1720. North Rona and Sula Sgeir SPA qualifies under Article 4.1 by regularly supporting populations of European importance of two Annex I species, as well as under Article 4.2 by regularly supporting populations of European importance of two migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including five species named only as component species

(**Table 4.224**). The potential for LSE has been identified for one of the nine qualifying species (**Table 4.224**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.

1721. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:

- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.

1722. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1723. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.224: Details on the Qualifying Features of the North Rona and Sula Sgeir SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	130,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	5,000 pairs	No
Great black-backed gull ¹	Breeding	Unfavourable declining	730 pairs	No
Guillemot	Breeding	Unfavourable declining	43,200 individuals	No
Razorbill ¹	Breeding	Unfavourable recovering	2,300 individuals	No
Puffin ¹	Breeding	Unfavourable declining	5,300 apparently occupied sites	No
European storm petrel	Breeding	Favourable maintained	Not available	No
Leach's storm petrel	Breeding	Unfavourable recovering	Not available	No
Fulmar ¹	Breeding	Unfavourable recovering	11,500 pairs	No
Gannet	Breeding	Favourable maintained	10,400 pairs	Yes
Notes:				
¹ Named component of the assemblage only.				

4.4.18.2 Assessment for the Gannet Population

1724. The North Rona and Sula Sgeir SPA gannet population is currently estimated to number 9,495 AOS (which is taken to equate to 18,990 individuals), based upon the most recently available count data from 2023 (JNCC and BTO, 2025). This represents a decline from the estimate of 12,271 AOS for 2017, which is likely to be attributable to the HPAI outbreak in 2022 (Burnell et al. 2023, Tremlett et al. 2024, JNCC and BTO, 2025). Prior to the HPAI outbreak, the overall trend for the SPA population appears to have been for a gradual increase since the 1930s (but with some fluctuations), with there being an estimated 9,143 AOS in 1985 (which is the earliest count available on the SMP) (Murray et al. 2015, JNCC and BTO, 2025). The North Rona and Sula Sgeir SPA population is the only gannet colony in the UK which is exploited for food, with a harvest of approximately 2000 well grown chicks taken each year (Murray et al. 2015). It seems likely that this harvest has been a factor in limiting the growth of the SPA population.
1725. Following the recent decline, the SPA population size is below the citation level of 10,400 pairs, although the population is still classed as having a 'favourable maintained' condition status (Table 4.224).

4.4.18.2.1 The Potential for Impacts on the Gannet Population

1726. The Bellrock WFDA plus two-kilometre buffer does not overlap with the North Rona and Sula Sgeir SPA, so that potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main

focus of the assessment for this qualifying feature is concerned with the Conservation Objective to ensure *the populations of the qualifying features are viable components of the SPA*.

1727. At a distance of 442 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the North Rona and Sula Sgeir SPA is within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity, and is also within the (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). However, this distance is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and two-kilometre buffer by North Rona and Sula Sgeir SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Wakefield et al. 2013)
1728. The apportioning calculations estimate that approximately 1.6% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this is likely to be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance.
1729. Gannets from the North Rona and Sula Sgeir SPA move south in autumn to winter in more southern waters, returning north in the spring. A proportion of the gannets from this SPA are considered to use routes that take them through the North Sea during autumn passage, but they are not considered to take such routes on the return migration in spring (when all birds are assumed to use westerly routes) (Furness, 2015). As such, there is a possibility that birds from the SPA population may pass through the Bellrock WFDA and two-kilometre buffer in the autumn (but not spring) passage period. The non-breeding period is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1730. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the North Rona and Sula Sgeir SPA gannet population to occur during breeding and non-breeding periods.

4.4.18.2.2 Project Alone: Construction and Decommissioning

4.4.18.2.2.1 Disturbance

1731. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Rona and Sula Sgeir SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the North Rona and Sula Sgeir SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.18.2.1**, see also Wakefield et al. 2013).

1732. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.1**. On the basis of these details as applied to the North Rona and Sula Sgeir SPA gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the North Rona and Sula Sgeir SPA gannet population.

4.4.18.2.2.2 Displacement

1733. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Rona and Sula Sgeir SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the North Rona and Sula Sgeir SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.18.2.1**, see also Wakefield et al. 2013).
1734. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the North Rona and Sula Sgeir SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the North Rona and Sula Sgeir SPA gannet population.

4.4.18.2.2.3 Changes to Prey Availability

1735. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Rona and Sula Sgeir SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the North Rona and Sula Sgeir SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.18.2.1**, see also Wakefield et al. 2013)
1736. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the North Rona and Sula Sgeir SPA gannet population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the North Rona and Sula Sgeir SPA gannet population.

4.4.18.2.3 *Project Alone: Operation and Maintenance*

4.4.18.2.3.1 Disturbance

1737. The assessment of the potential effects of displacement during the construction and decommissioning phases on the North Rona and Sula Sgeir SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the North Rona and Sula Sgeir SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.18.2.1**, see also Wakefield et al. 2013).

1738. The details of the assessment of the potential effects of O&M phase disturbance on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the North Rona and Sula Sgeir SPA gannet population, it is considered that there is no potential for disturbance during the O&M phase to lead to an adverse effect on the North Rona and Sula Sgeir SPA gannet population.

4.4.18.2.3.2 Displacement/Barrier Effects

1739. The potential effects of displacement and barrier effects during the O&M phase on the North Rona and Sula Sgeir SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.225**). The resultant seasonal mortality estimates were then apportioned to the North Rona and Sula Sgeir SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.225**.

Table 4.225: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the North Rona and Sula Sgeir SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.016	0.016	0.10
Autumn passage	224	N/A	0.004	0.007	N/A
Spring passage	159	N/A	0.000	0.000	N/A

1740. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the North Rona and Sula Sgeir SPA gannet population as a result of displacement is estimated to be 0.03 to 0.10 breeding adult birds and 0.01 to 0.03 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.226**). Approximately 61% of the potential mortality from displacement is predicted to occur during the breeding season.

Table 4.226: Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.025	0.001
	Autumn passage	70%	1%	0.006	0.010
	Spring passage	70%	1%	0.000	0.000
	Annual total	-	-	0.032	0.011
Upper mortality estimate	Breeding	70%	3%	0.076	0.002
	Autumn passage	70%	3%	0.019	0.031
	Spring passage	70%	3%	0.000	0.000
	Annual total	-	-	0.095	0.033

1741. The additional annual mortality of adult gannets from the North Rona and Sula Sgeir SPA population predicted due to displacement from the Bellrock WFDA represents 0.0002% (lower estimate) to 0.0005% (upper estimate) of the current adult breeding population at this colony (i.e. 18,990 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.002% and 0.006%.

1742. Based upon the above, the potential levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.18.2.3.3 Collision Risk

1743. The collision estimates for the North Rona and Sula Sgeir SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the North Rona and Sula Sgeir SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during

the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

1744. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.22 adult and 0.02 subadult birds (**Table 4.227**). In contrast to the displacement effects, a large proportion of this mortality (i.e. 89%) is predicted to occur during the breeding season. This potential additional mortality of adult birds represents 0.0005% of the current adult breeding population at this colony (i.e. 18,990 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.014%.

Table 4.227: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the North Rona and Sula Sgeir SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.207	0.006
Autumn passage	0.010	0.016
Spring passage	0.000	0.000
Annual total	0.217	0.022

1745. Based upon the above, the potential levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.18.2.3.4 Combined Collisions and Displacement/Barrier Effects

1746. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.25 and 0.31 adult and 0.03 and 0.06 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0013% to 0.0016% of the current adult breeding population at this colony (i.e. 18,990 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point

increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.016% and 0.020%.

1747. Based upon the above, the potential levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.18.2.3.5 Changes to Prey Availability

1748. The assessment of the potential effects of changes to prey availability during the O&M phase on the North Rona and Sula Sgeir SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the North Rona and Sula Sgeir SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently very low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.18.2.1**, see also Wakefield et al. 2013).
1749. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the North Rona and Sula Sgeir SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the North Rona and Sula Sgeir SPA gannet population.

4.4.18.2.4 Project Alone Conclusion

1750. The potential effects from the Bellrock Wind Farm Infrastructure alone on the North Rona and Sula Sgeir SPA gannet population are predicted to be extremely small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents less than one third of an adult bird and only 0.002% of the SPA population (with this population having increased over the long-term, albeit gradually and with some fluctuations), it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the North Rona and Sula Sgeir SPA gannet population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.18.2.5 Effects In-combination

4.4.18.2.5.1 Effects of Relevance to the In-combination Assessment

1751. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the North Rona and Sula Sgeir SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the

population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

1752. It is also concluded that the potential mortality from the combined effects of collisions and displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from these effect pathways on the North Rona and Sula Sgeir SPA gannet population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.18.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1753. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the North Rona and Sula Sgeir SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1754. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (**Table 4.226**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1755. Full details of the displacement mortality estimates for the North Rona and Sula Sgeir SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (**Table 4.228**).

Table 4.228: Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	1.65	1.18
	Upper mortality estimate	4.96	3.55
Including Berwick Bank Wind Farm	Lower mortality estimate	1.82	1.24
	Upper mortality estimate	5.45	3.71
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1756. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from two to five breeding adult birds and one to four subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are two to five adults and one to four subadults (**Table 4.228**).
1757. In terms of the additional annual mortality of adult birds, these estimates represent 0.0087% (lower estimate) to 0.0261% (upper estimate) of the current adult breeding population at this colony (i.e. 18,990 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0096% (lower estimate) to 0.0287% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, it is only the upper estimates of the potential displacement mortality that represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.108% to 0.323% (with the Berwick Bank Wind Farm effects excluded) and 0.118% to 0.354% (with the Berwick Bank Wind Farm effects included).
1758. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm

Infrastructure in-combination with the other plans and projects for the upper displacement mortality estimates only. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.229: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Rona and Sula Sgeir SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	25,986	1.0073	N/A	N/A	N/A
Excluding Berwick Bank	Upper mortality estimate	25,742	1.0070	0.9997	0.9898	48.40
Including Berwick Bank	Upper mortality estimate	25,686	1.0070	0.9997	0.9885	47.98

1759. No adverse effect on the North Rona and Sula Sgeir SPA gannet population was concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025). Therefore, in the event of the Berwick Bank Wind Farm being constructed and becoming operational, no compensation would be provided to offset the predicted mortality to this SPA population as a result of the potential effects resulting from this development. Given this, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm. The predicted impacts for the upper mortality estimates of this in-combination scenario are small, with the CPS value indicating a reduction of 1% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.03% (**Table 4.229**).
1760. As for the PVAs for the Forth Islands SPA gannet population (**Section 4.4.5.5.2**, **Section 4.4.5.5.3** and **Section 4.4.5.5.4**), the additional PVAs for the displacement mortality to the North Rona and Sula Sgeir SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact as measured by the CPS values, although the CPGR values remained relatively unchanged compared to those for the 35-year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) is predicted at 1% for the upper mortality estimate (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1761. Based upon the above, the potential levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the predicted mortality from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and would be inconsequential in population terms.

4.4.18.2.5.3 Collision Risk – Operation and Maintenance

1762. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the North Rona and Sula Sgeir SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Buchan Ness to Collieston Coast SPA kittiwake population in **Section 4.4.1.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1763. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.5.5.3** for the Forth Islands SPA gannet population. As stated in **Section 4.4.5.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1764. Full details of the collision estimates for the North Rona and Sula Sgeir SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.230**).

Table 4.230: Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	1.86	0.91
Including Berwick Bank Wind Farm	1.89	0.93

1765. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is an order of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is two breeding adult birds and one subadult bird with the Berwick Bank Wind Farm collision estimate included (noting that exclusion of the Berwick Bank Wind Farm estimate has little effect on the potential mortality) (**Table 4.230**).

1766. In terms of the additional annual mortality of adult birds, these estimates represent 0.0098% (Berwick Bank excluded) to 0.0099% (Berwick Bank included) of the current adult breeding population at this colony (i.e. 18,990 individuals) (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. This does not represent an increase in baseline mortality levels (i.e. without any wind farm impacts) which exceeds the 0.02 percentage point increase, at which point NatureScot would consider requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of between 0.121% (excluding Berwick Bank) and 0.123% (including Berwick Bank).
1767. Given the above, PVAs were not undertaken to assess the population-level impact of the predicted collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. It is concluded that the potential levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the predicted collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase would be small and inconsequential in population terms.

4.4.18.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1768. The potential mortality attributed to the North Rona and Sula Sgeir SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is presented in **Table 4.231**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.18.2.5.2** and **Section 4.4.18.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.231: Potential Annual Mortality of North Rona and Sula Sgeir SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	3.52	2.10
	Upper mortality estimate	6.82	4.47
Including Berwick Bank Wind Farm	Lower mortality estimate	3.70	2.17
	Upper mortality estimate	7.34	4.64
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.226 and Table 4.228 due to rounding errors.			

1769. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from four to seven breeding adult birds and two to four subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are four to seven adults and two to five subadults. These estimates represent 0.0185% (lower estimate) to 0.0359% (upper estimate) of the current adult breeding population at this colony (i.e. 18,990 individuals) with Berwick Bank Wind Farm effects excluded, and 0.0195% (lower estimate) to 0.0386% (upper estimate) of the adult breeding population with Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Therefore, only the upper estimates exceed the 0.02 percentage point increase, which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.229% to 0.444% (with the Berwick Bank Wind Farm effects excluded) and 0.241% to 0.477% (with the Berwick Bank Wind Farm effects included).
1770. Given the above, PVAs were undertaken to assess the population-level impact of the upper level of the predicted combined displacement and collision mortality only. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.231** followed the methods

and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**). Focussing on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.4.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of approximately 1.5% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.04% (**Table 4.232**, source: from the Seabird Monitoring Programme Database (JNCC and BTO, 2025)).

Table 4.232: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the North Rona and Sula Sgeir SPA Gannet Population due to the Potential Combined Collision and Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination With Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	25,986	1.0073	N/A	N/A	N/A
Excluding Berwick Bank	Upper mortality estimate	25,619	1.0069	0.9996	0.9865	47.56
Including Berwick Bank	Upper mortality estimate	25,602	1.0069	0.9996	0.9851	47.42

1771. As for the PVAs detailed in **Section 4.4.18.2.5.2** above (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small increases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 1.5% for the upper mortality estimates (**Table 3.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.18.2.6 In-combination Conclusion

1772. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the North Rona and Sula Sgeir SPA gannet population is predicted to result in the population being up to 1.5% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the projected future population is associated with a reduction in the annual population growth rate of up to 0.04%. Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.18.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (less than one third of an adult bird, representing only 0.002% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.

1773. The predicted levels of impact on the North Rona and Sula Sgeir SPA gannet population resulting from the combined displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects are considered to be small and would be inconsequential in population terms.
1774. Consequently, it is concluded that there is no potential for an adverse effect on the North Rona and Sula Sgeir SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.
1775. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.18.3 Assessment for the Breeding Seabird Assemblage

1776. The breeding seabird assemblage for the North Rona and Sula Sgeir SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 130,000 individual seabirds). Gannet is one of nine species identified in the citation as having nationally important populations which contribute to the North Rona and Sula Sgeir SPA breeding seabird assemblage.
1777. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA gannet population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA gannet population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that gannet is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1778. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the North Rona and Sula Sgeir SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.18.4 Site Conclusion

1779. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the North Rona and Sula Sgeir SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the North Rona and Sula Sgeir SPA.

4.4.19 Hermaness, Saxa Vord and Valla Field SPA

4.4.19.1 European Site Information and Conservation Objectives

1780. Hermaness, Saxa Vord and Valla Field SPA lies in the northwest corner of the island of Unst, Shetland, at the northernmost tip of Britain and approximately 427 km from the Bellrock WFDA. The boundary of the SPA is coincident with that of the Hermaness SSSI, Saxa Vord SSSI, and Valla Field SSSI and the seaward extension extends approximately 2 km into the marine environment. The SPA was classified in 2001, with the marine extension classified in 2009.
1781. Hermaness, Saxa Vord and Valla Field SPA qualifies under Article 4.1 by regularly supporting a population of European importance of one Annex I species, as well as under Article 4.2 by regularly supporting populations of European importance of three migratory species, and by regularly supporting in excess of 20,000 breeding seabirds, including four species named only as component species (**Table 4.233**). The potential for LSE has been identified in relation to one of the eight qualifying features (**Table 4.233**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1782. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1783. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1784. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.233: Details on the Qualifying Features of the Hermaness, Saxa Vord and Valla Field SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Unfavourable declining	157,500 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	922 pairs	No
Great skua	Breeding	Unfavourable declining	788 pairs	No
Guillemot ¹	Breeding	Unfavourable declining	25,000 individuals	No
Puffin	Breeding	Unfavourable recovering	55,000 individuals	No
Red-throated diver	Breeding	Unfavourable declining	26 pairs	No
Fulmar ¹	Breeding	Unfavourable declining	19,539 pairs	No
Gannet	Breeding	Favourable maintained	16,400 pairs	Yes
Shag ¹	Breeding	Unfavourable declining	450 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.19.2 Assessment for the Gannet Population

1785. The Hermaness, Saxa Vord and Valla Field SPA gannet population is currently estimated to number 19,803 AOS (which is taken to equate to 39,606 individuals), based upon the most recent available count data from 2024 (JNCC and BTO, 2025). This represents a decline from the estimated 29,562 AOS in 2021 but an increase from the 18,739 AON estimated in 2023 immediately after the HPAI outbreak in 2022 (Burnell et al. 2023, Tremlett et al. 2024, JNCC and BTO, 2025). Prior to the HPAI outbreak, the SPA population had been increasing since the early 1930s, with the 2021 estimate representing an 89% increase over the estimated 15,633 AOS in 2003 (Murray et al. 2015, JNCC and BTO, 2025). The SPA population size remains considerably above the citation level of 16,400 pairs and has 'favourable maintained' condition status (Table 4.233).

4.4.19.2.1 The Potential for Impacts on the Gannet Population

1786. The Bellrock WFDA plus 2 km buffer does not overlap with the Hermaness, Saxa Vord and Valla Field SPA, so potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
1787. The Hermaness, Saxa Vord and Valla Field SPA is 456 km from the Bellrock WFDA. The Hermaness, Saxa Vord and Valla Field SPA is therefore within the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023). also, Ver, this distance

is also well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and 2 km buffer by Hermaness, Saxa Vord and Valla Field SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Wakefield et al. 2013).

1788. The apportioning calculations estimate that approximately 4% of the gannets occurring on the Bellrock WFDA during the breeding season derive from this SPA colony (**Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**), although the above considerations suggest this is likely to be an overestimate. The breeding period for gannet is defined as mid-March to September, following the NatureScot (2020b) guidance
1789. Gannets from the Hermaness, Saxa Vord and Valla Field SPA move south in autumn to winter in more southern waters, returning north in the spring, with the passage movements during both periods involving routes which mean that birds from the SPA population may pass through the Bellrock WFDA and 2 km buffer (Furness, 2015). Thus, the non-breeding season is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1790. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the Hermaness, Saxa Vord and Valla Field SPA gannet population to occur during breeding and non-breeding periods.

4.4.19.2.2 Project Alone: Construction and Decommissioning

4.4.19.2.2.1 Disturbance

1791. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Hermaness, Saxa Vord and Valla Field SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Hermaness, Saxa Vord and Valla Field SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.19.2.1**, see also Wakefield et al. 2013).
1792. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.1**. On the basis of these details as applied to the Hermaness, Saxa Vord and Valla Field SPA gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population.

4.4.19.2.2.2 Displacement

1793. The assessment of the potential effects of displacement during the construction and decommissioning phases on the Hermaness, Saxa Vord and Valla Field SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Hermaness, Saxa Vord

and Valla Field SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.19.2.1**, see also Wakefield et al. 2013).

1794. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the Hermaness, Saxa Vord and Valla Field SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population.

4.4.19.2.2.3 Changes to Prey Availability

1795. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Hermaness, Saxa Vord and Valla Field SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Hermaness, Saxa Vord and Valla Field SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.19.2.1**, see also Wakefield et al. 2013).
1796. The details of the assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Hermaness, Saxa Vord and Valla Field SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population.

4.4.19.2.3 *Project Alone: Operation and Maintenance*

4.4.19.2.3.1 Disturbance

1797. The assessment of the potential effects of disturbance during the O&M phase on the Hermaness, Saxa Vord and Valla Field SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Hermaness, Saxa Vord and Valla Field SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.19.2.1**, see also Wakefield et al. 2013).
1798. The details of the assessment of the potential effects of disturbance during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these details as applied to the Hermaness, Saxa Vord and Valla Field SPA gannet population, it is considered that there is no potential for O&M related disturbance to lead to an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population.

4.4.19.2.3.2 Displacement/Barrier Effects

1799. The potential effects of displacement and barrier effects during the O&M phase on the Hermaness, Saxa Vord and Valla Field SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and two-kilometre buffer for each

seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.234**). The resultant seasonal mortality estimates were then apportioned to the Hermaness, Saxa Vord and Valla Field SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.234**.

Table 4.234: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Hermaness, Saxa Vord and Valla Field SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.037	0.037	0.10
Autumn passage	224	N/A	0.085	0.069	N/A
Spring passage	159	N/A	0.137	0.064	N/A

1800. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Hermaness, Saxa Vord and Valla Field SPA gannet population as a result of displacement is estimated to be 0.35 to 1.03 breeding adult birds and 0.18 to 0.54 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.235**). As a result of the distance of the Hermaness, Saxa Vord and Valla Field SPA from the Bellrock WFDA, the majority of the potential mortality from displacement is predicted to occur during the non-breeding season.

Table 4.235: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.058	0.002
	Autumn passage	70%	1%	0.137	0.111
	Spring passage	70%	1%	0.151	0.070
	Annual total	-	-	0.346	0.182
Upper mortality estimate	Breeding	70%	3%	0.175	0.005
	Autumn passage	70%	3%	0.401	0.325
	Spring passage	70%	3%	0.453	0.210
	Annual total	-	-	1.029	0.540

1801. The additional annual mortality of adult gannets from the Hermaness, Saxa Vord and Valla Field SPA population predicted due to displacement from the Bellrock WFDA represents 0.0009% (lower estimate) to 0.0026% (upper estimate) of the current adult breeding population at this colony (i.e. 39,606 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.011% and 0.032%.
1802. Based upon the above, the potential levels of impact on the Hermaness, Saxa Vord and Valla Field SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.19.2.3.3 Collision Risk

1803. The collision estimates for the Hermaness, Saxa Vord and Valla Field SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the Hermaness, Saxa Vord and Valla Field SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.
1804. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.77 adult and 0.22 subadult birds (**Table 4.236**). This potential additional mortality of adult birds represents 0.0019% of the current adult breeding population at this colony (i.e. 39,606 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.024%.

Table 4.236: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the Hermaness, Saxa Vord and Valla Field SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.479	0.015
Autumn passage	0.210	0.170
Spring passage	0.082	0.038
Annual total	0.771	0.223

1805. Based upon the above, the potential levels of impact on the Hermaness, Saxa Vord and Valla Field SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.19.2.3.4 Combined Collisions and Displacement/Barrier Effects

1806. When treated as additive, the combined effects of collisions and displacement give predicted additional annual mortality estimates of one to two adult and 0.41 to 0.76 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0028% to 0.0045% of the current adult breeding population at this colony (i.e. 39,606 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of between 0.035% and 0.056%.
1807. Based upon the above, the potential levels of impact on the Hermaness, Saxa Vord and Valla Field SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.19.2.3.5 Changes to Prey Availability

1808. The assessment of the potential effects of changes to prey availability during the O&M phase on the Hermaness, Saxa Vord and Valla Field SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the Hermaness, Saxa Vord and Valla Field SPA, with consequently low estimated usage of the Bellrock WFDA by this SPA population during the breeding season (**Section 4.4.19.2.1**, see also Wakefield et al. 2013).

1809. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the Hermaness, Saxa Vord and Valla Field SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population.

4.4.19.2.4 Project Alone Conclusion

1810. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Hermaness, Saxa Vord and Valla Field SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.19.2.5 Effects In-combination

4.4.19.2.5.1 Effects of Relevance to the In-combination Assessment

1811. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Hermaness, Saxa Vord and Valla Field SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1812. Therefore, the potential for effects of the Bellrock WFDA to act on the Hermaness, Saxa Vord and Valla Field SPA gannet population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.19.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1813. As described in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV), estimates of the displacement mortality attributed to the Hermaness, Saxa Vord and Valla Field SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in Section 4.4.5.5.2). This was as agreed by NatureScot (**Table 1.1**).
1814. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (Table 4.235), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1815. Full details of the displacement mortality estimates for the Hermaness, Saxa Vord and Valla Field SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with

those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.237**).

Table 4.237: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	21.06	16.88
	Upper mortality estimate	63.19	50.63
Including Berwick Bank Wind Farm	Lower mortality estimate	22.13	17.59
	Upper mortality estimate	66.38	52.75
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1816. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. With the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from 21 to 63 breeding adult birds and 17 to 51 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 22 to 66 adults and 18 to 53 subadults (**Table 4.237**).
1817. In terms of the additional annual mortality of adult birds, these estimates represent 0.0532% (lower estimate) to 0.1595% (upper estimate) of the current adult breeding population at this colony (i.e. 39,606 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0559% (lower estimate) to 0.1676% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.657% to 1.970% (with the Berwick Bank Wind Farm effects excluded) and 0.690% to 2.069% (with the Berwick Bank Wind Farm effects included).

1818. Given the above, PVAs were undertaken to assess the population-level impact of the predicted displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.5.5.2** for the potential displacement mortality to the Forth Islands SPA gannet population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.238: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	51,382	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	50,245	1.0055	0.9994	0.9778	46.14
	Upper mortality estimate	48,036	1.0042	0.9981	0.9349	38.18
Including Berwick Bank	Lower mortality estimate	50,248	1.0054	0.9994	0.9769	46.14
	Upper mortality estimate	47,795	1.0041	0.9980	0.9321	37.12

1819. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the upper mortality estimate indicating a reduction of 7% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.19% (**Table 4.238**). The metrics for the lower mortality estimates indicate reductions of 2% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.06% in the annual population growth rate.
1820. As for the PVAs for the Forth Islands SPA gannet population (**Section 4.4.5.5.2**, **Section 4.4.5.5.3** and **Section 4.4.5.5.4**), the additional PVAs for the displacement mortality to the Hermaness, Saxa Vord and Valla Field SPA gannet population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. The reduction in the size of the SPA

population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 7% and 2% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

1821. Given the overall long-term, and sustained, increase in the Hermaness, Saxa Vord and Valla Field SPA gannet population, which remains considerably above the citation population size, it is considered that the small predicted levels of impact due to the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects would not result in an adverse effect on the SPA population. Although the SPA population has undergone a recent decline following the HPAI outbreak in 2022, there are signs of recovery from this decline, with the population increasing between 2023 and 2024.

4.4.19.2.5.3 Collision Risk – Operation and Maintenance

1822. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the Hermaness, Saxa Vord and Valla Field SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1823. Details of the NEEOG Interim CEF collision totals are summarised **Section 4.4.5.5.3** for the Forth Islands SPA gannet population. As stated in **Section 4.4.5.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1824. Full details of the collision estimates for the Hermaness, Saxa Vord and Valla Field SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.239**).

Table 4.239: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to Collisions at the Bellrock WFDA In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	15.71	10.79
Including Berwick Bank Wind Farm	16.61	11.05

1825. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, the potential mortality is 16 breeding adult birds and 11 subadult birds with the Berwick Bank Wind Farm collision estimate excluded (noting that exclusion of the Berwick Bank Wind Farm estimate has little effect on the potential mortality) (**Table 4.239**).
1826. In terms of the additional annual mortality of adult birds, these estimates represent 0.0397% of the current adult breeding population at this colony (i.e. 39,606 individuals) irrespective of whether the Berwick Bank Wind Farm estimate is included or not (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. This represents an increase in baseline mortality levels (i.e. without any wind farm impacts) which exceeds the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.490% (Berwick Bank excluded) to 0.518% (Berwick Bank included).
1827. Given the above, PVAs were undertaken to assess the population-level impact of the predicted collision mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Forth Islands SPA gannet population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.240: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	51,382	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	50,531	1.0057	0.9995	0.9838	47.20
Including Berwick Bank	50,476	1.0056	0.9995	0.9836	46.92

1828. For the reasons given in **Section 4.4.1.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (with the potential for an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate,

2025)). The predicted impacts for this in-combination scenario are small, with the CPS value for the collision mortality estimate indicating a reduction of 2% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.05% (**Table 4.240**).

1829. As for the PVAs undertaken for the potential displacement mortality from the Bellrock Wind Farm Infrastructure In-combination with the other plans and projects (**Section 4.4.19.2.5.2**), the additional PVAs for the collision mortality over the 50 year projections (which included a 15 year recovery period with no wind effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. The reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 2% (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).
1830. Given the overall long-term, and sustained, increase in the Hermaness, Saxa Vord and Valla Field SPA gannet population, which remains considerably above the citation population size, it is considered that the small predicted levels of impact due to the potential collision mortality from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects would not result in an adverse effect on the SPA population. Although the SPA population has undergone a recent decline following the HPAI outbreak in 2022, there are signs of recovery from this decline, with the population increasing between 2023 and 2024

4.4.19.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1831. The potential mortality attributed to the Hermaness, Saxa Vord and Valla Field SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects is presented in **Table 4.241**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.19.2.5.2** and **Section 4.4.19.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.241: Potential Annual Mortality of Hermaness, Saxa Vord and Valla Field SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	36.77	27.67
	Upper mortality estimate	78.89	61.42
Including Berwick Bank Wind Farm	Lower mortality estimate	38.74	28.64
	Upper mortality estimate	82.99	63.80
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.237 and Table 4.239 due to rounding errors.			

1832. With the Berwick Bank Wind Farm effects excluded, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 37 to 79 breeding adult birds and 28 to 61 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). The equivalent mortality estimates with the Berwick Bank Wind Farm effects included are 39 to 83 adults and 29 to 64 subadults. These estimates represent 0.0928% (lower estimate) to 0.1992% (upper estimate) of the current adult breeding population at this colony (i.e. 39,606 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0978% (lower estimate) to 0.2095% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, both the lower and upper estimates of the potential combined displacement and collisions mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 1.146% to 2.459% (with the Berwick Bank Wind Farm effects excluded) and 1.207% to 2.587% (with the Berwick Bank Wind Farm effects included).

1833. The PVAs undertaken to assess the population-level impact of the predicted mortalities in **Table 4.242** followed the methods and approach described in **Section 4.4.1.2.5.2** (with full details of the approach and methods presented in **Appendix 10.4: Offshore Ornithology Population**

Viability Technical Report (Volume IV)). Focussing on the outputs that exclude the predicted mortality from the Berwick Bank Wind Farm (for the reasons given in **Section 4.4.1.2.5.2**), the CPS value for the upper mortality estimate indicates a reduction of 8% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0.23% (**Table 4.242**). The metrics for the lower mortality estimates indicate reductions of 4% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0.11% in the annual population growth rate.

Table 4.242: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Hermaness, Saxa Vord and Valla Field SPA Gannet Population due to the Potential Combined Displacement and Collision Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	51,382	1.0061	N/A	N/A	N/A
Excluding Berwick Bank	Lower mortality estimate	49,388	1.0050	0.9989	0.9625	43.00
	Upper mortality estimate	47,252	1.0038	0.9977	0.9202	35.22
Including Berwick Bank	Lower mortality estimate	49,291	1.0050	0.9989	0.9609	42.70
	Upper mortality estimate	47,059	1.0037	0.9976	0.9168	34.72

1834. As for the PVAs detailed in **Section 4.4.19.2.5.2** and **Section 4.4.19.2.5.3** (see also **Section 4.4.1.2.5.2**), the additional PVAs for the combined displacement and collision mortality over the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. There were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 8% and 4% for the upper and lower mortality estimates, respectively (Table 3.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.19.2.6 In-combination Conclusion

1835. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Hermaness, Saxa Vord and Valla Field SPA gannet population is predicted to result in the population being up to 8% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This potential reduction in the size of the

projected future population is associated with a reduction in the annual population growth rate of up to 0.23%. These estimates are based on excluding the predicted mortality for the Berwick Bank Wind Farm from the in-combination totals because the consent for the Berwick Bank Wind Farm is dependent on the provision of compensation to offset the predicted mortality from this project on those SPA populations (including the Hermaness, saxa Vord and Valla Field SPA gannets) for which the potential for an adverse effect was concluded (Marine Directorate, 2025).

1836. The scale of the potential reduction in the SPA population size (relative to that predicted in the absence of any wind farm effects) is within the context of a population which has increased over the long-term, with a near doubling in numbers between the early 2000s and 2021 (**Section 4.4.19.2**). Over this period the population growth rate averaged 3.6% per annum. Even with a reduction of 0.23% in this annual growth rate (as predicted for the upper mortality estimate), the population would still increase and would be three times larger than currently after 35 years. Although the SPA population declined markedly immediately after the HPAI outbreak in 2022, there are signs of recovery from this decline, with a subsequent increase in numbers between 2023 and 2024.
1837. On the basis of the above context and the small scale of the predicted impacts, it is concluded that there is no potential for an adverse effect on the Hermaness, Saxa Vord and Valla Field SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.19.3 Assessment for the Breeding Seabird Assemblage

1838. The breeding seabird assemblage for the Hermaness, Saxa Vord and Valla Field SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 157,500 individual seabirds). Gannet is one of eight species identified in the citation as having nationally important populations which contribute to the Hermaness, Saxa Vord and Valla Field SPA breeding seabird assemblage.
1839. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA gannet population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that gannet is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1840. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Hermaness, Saxa Vord and Valla Field SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.19.4 Site Conclusion

1841. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Hermaness, Saxa Vord and Valla Field SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Hermaness, Saxa Vord and Valla Field SPA.

4.4.20 St Kilda SPA

4.4.20.1 European Site Information and Conservation Objectives

1842. The isolated island group of St Kilda is located approximately 70 km west of North Uist, with the SPA approximately 507 km from the Bellrock WFDA. The islands are steep, including sea cliffs over 400 m in height and with vegetation consisting of acidic grassland and sub-maritime heath. The boundary of the SPA overlaps the boundary of St. Kilda SSSI, and the seaward extension extends approximately 4 km into the marine environment, including the seabed, water column and surface. The SPA was classified in 1992, with the seaward extension classified in 2009.
1843. St Kilda SPA qualifies under Article 4.1 by regularly supporting populations of European importance of two Annex I species (**Table 4.243**). St Kilda SPA also qualifies under Article 4.2 by regularly supporting populations of European importance of three migratory species, and by supporting in excess of 20,000 breeding seabirds, including five species named only as component species (**Table 4.243**). The potential for LSE has been identified in relation to one of the ten qualifying species (**Table 4.243**), with the effect pathways associated with LSE for each of these detailed in **Table 2.1** and set out in the assessment below.
1844. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1845. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.

1846. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.243: Details on the Qualifying Features of the St Kilda SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	600,000 individuals	Yes
Kittiwake ¹	Breeding	Unfavourable declining	7,830 pairs	No
Great skua	Breeding	Unfavourable declining	270 pairs	No
Guillemot ¹	Breeding	Unfavourable declining	22,700 individuals	No
Puffin	Breeding	Unfavourable declining	155,000 pairs	No
European storm petrel	Breeding	Favourable maintained	850 pairs	No
Leach's storm petrel	Breeding	Favourable maintained	5,000 pairs	No
Manx shearwater ¹	Breeding	Unfavourable, no change	5,000 pairs	No
Fulmar ¹	Breeding	Unfavourable declining	62,800 pairs	No
Razorbill ¹	Breeding	Unfavourable declining	3,810 individuals	No
Gannet	Breeding	Favourable maintained	50,050 pairs	Yes
Notes:				
¹ Named component of the assemblage only.				

4.4.20.2 Assessment for the Gannet Population

1847. The St Kilda SPA gannet population is currently estimated to number 59,205 AOS (equating to 118,410 individuals), based upon the most recent available count data from 2023 (JNCC and BTO, 2025). Gannet are listed on the SPA citation as a migratory species feature, as well as forming part of the breeding seabird assemblage. Gannets are known to have bred on St Kilda for hundreds of years, and the population has been relatively stable at around 60,000 pairs over the last few decades (Murray et al. 2015). The most recent estimate of the St Kilda SPA gannet population was made in 2023, and determined that the population had likely declined by 2-3% as a result of the 2022 HPAI outbreak (JNCC and BTO, 2025). This decline is substantially smaller than occurred at some other colonies (Tremlett et al. 2024). The longer-term impacts of HPAI on the previously widespread and sustained increase in the wider UK gannet population are currently unclear (Lane et al. 2023), but the population size within the St Kilda SPA remains above the citation level of 50,050 pairs (Table 4.243).

4.4.20.2.1 The Potential for Impacts on the Gannet Population

1848. The Bellrock WFDA plus two-kilometre buffer does not overlap with the St Kilda SPA, so potential impacts on its gannet population will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site* because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this first Conservation Objective (as for the objective to *maintain in the long term no significant disturbance of the species*, because disturbance would only be considered significant if it caused an adverse effect on the population viability of the qualifying features).
1849. The St Kilda SPA is 609 km from the Bellrock WFDA. The St Kilda SPA is therefore beyond the mean maximum plus one standard deviation of the breeding season foraging range for gannet, which is typically the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023). However, in the case of St Kilda SPA, NatureScot has advised that the max foraging range (709 km) should be used to determine connectivity (NatureScot, 2023). This distance is well beyond the mean breeding season foraging range of gannet (120.4 km – Woodward et al. 2019), which suggests that the actual usage of the Bellrock WFDA and two-kilometre buffer by St Kilda SPA gannets during the breeding season is likely to be low, despite the potential for connectivity. Furthermore, analyses of gannet tracking data from multiple colonies in Britain and Ireland suggest that the breeding season foraging ranges of birds from different colonies tend to be mutually exclusive, with the Bellrock WFDA encompassed by the foraging ranges of birds from the Forth islands SPA population (Langston et al. 2013, Wakefield et al. 2013).
1850. Gannets from the St Kilda SPA move south in autumn to winter in more southern waters, returning north in the spring, with the passage movements during these periods involving routes which mean that birds from the SPA population may pass through the Bellrock WFDA and two-kilometre buffer (Furness, 2015). Thus, the non-breeding season is divided into autumn and spring passage periods (defined as October to November and December to mid-March, respectively, on the basis of applying the BDMPs defined periods within the context of the overall non-breeding period defined by NatureScot – Furness 2015, NatureScot 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1851. Given the above, there is potential for effects from the Bellrock Wind Farm Infrastructure on the St Kilda SPA gannet population to occur during breeding and non-breeding periods.

4.4.20.2.2 Project Alone: Construction and Decommissioning

4.4.20.2.2.1 Disturbance

1852. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the St Kilda SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the St Kilda SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that modelling of foraging distributions from tracking data suggest that there should be little usage of the Bellrock WFDA during the breeding season by gannets from the St Kilda SPA (Wakefield et al. 2013).

1853. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.1**. On the basis of these details as applied to the St Kilda SPA gannet population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the St Kilda SPA gannet population.

4.4.20.2.2.2 Displacement

1854. The assessment of the potential effects of displacement during the construction and decommissioning phases on the St Kilda SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the St Kilda SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that modelling of foraging distributions from tracking data suggest that there should be little usage of the Bellrock WFDA during the breeding season by gannets from the St Kilda SPA (Wakefield et al. 2013).
1855. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.2**. On the basis of these details as applied to the St Kilda SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the St Kilda SPA gannet population.

4.4.20.2.2.3 Changes to Prey Availability

1856. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the St Kilda SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the St Kilda SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that modelling of foraging distributions from tracking data suggest that there should be little usage of the Bellrock WFDA during the breeding season by gannets from the St Kilda SPA (Wakefield et al. 2013).
1857. The details of the assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the St Kilda SPA gannet population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the St Kilda SPA gannet population.

4.4.20.2.3 *Project Alone: Operation and Maintenance*

4.4.20.2.3.1 Disturbance

1858. The assessment of the potential effects of disturbance during the O&M phase on the St Kilda SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the St Kilda SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that modelling of foraging distributions from tracking data suggest that there should be little usage of the Bellrock WFDA during the breeding season by gannets from the St Kilda SPA (Wakefield et al. 2013).
1859. The details of the assessment of the potential effects of disturbance during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.3.1**. On the basis of these

details as applied to the St Kilda SPA gannet population, it is considered that there is no potential for O&M related disturbance to lead to an adverse effect on the St Kilda SPA gannet population.

4.4.20.2.3.2 Displacement/Barrier Effects

1860. The potential effects of displacement and barrier effects during the O&M phase on the St Kilda SPA gannet population were assessed using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.2**. Thus, the displacement and mortality rates advised for gannet by NatureScot (2023d) were applied to the mean peak population sizes of gannet within the Bellrock WFDA and two-kilometre buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.244**). The resultant seasonal mortality estimates were then apportioned to the St Kilda SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.244**.

Table 4.244: Gannet Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the St Kilda SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	258	0.973	0.043	0.043	0.10
Autumn passage	224	N/A	0.026	0.042	N/A
Spring passage	159	N/A	0.000	0.000	N/A

1861. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the St Kilda SPA gannet population as a result of displacement is estimated to be 0.11 to 0.33 breeding adult birds and 0.07 to 0.21 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.245**). As a result of the distance of the St Kilda SPA from the Bellrock WFDA, the majority of the potential mortality from displacement is predicted to occur during the non-breeding season.

Table 4.245: Potential Annual Mortality of St Kilda SPA Gannets due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	70%	1%	0.068	0.002
	Autumn passage	70%	1%	0.042	0.068
	Spring passage	70%	1%	0.000	0.000
	Annual total	-	-	0.110	0.070
Upper mortality estimate	Breeding	70%	3%	0.203	0.006
	Autumn passage	70%	3%	0.123	0.199
	Spring passage	70%	3%	0.000	0.000
	Annual total	-	-	0.326	0.205

1862. The additional annual mortality of adult gannets from the St Kilda SPA population predicted due to displacement from the Bellrock WFDA represents 0.0001% (lower estimate) to 0.0003% (upper estimate) of the current adult breeding population at this colony (i.e. 118,410 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to increases of 0.001% and 0.003%.

1863. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.3.3 Collision Risk

1864. The collision estimates for the St Kilda SPA gannet population due to the Bellrock WFDA alone were determined using the approach and methods outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.3.3**, with the assessment based on the estimates for the worst-case design (**Table 3.1**). Collision estimates were derived for each seasonal period, with these estimates then apportioned to the St Kilda SPA and to the adult and subadult age classes, with account also made for the likely occurrence of sabbatical birds during the breeding season. Full details of the

methods for estimating collision mortality and for apportioning are presented in **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)**, respectively.

1865. Based upon the above, the annual collision mortality for the worst-case design is predicted to be 0.62 adult and 0.12 subadult birds (**Table 4.246**). This potential additional mortality of adult birds represents 0.0005% of the current adult breeding population at this colony (i.e. 118,410 individuals) (Table 2.3 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential collision mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of the percentage increase in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the collision mortality estimate equates to an increase of 0.006%.

Table 4.246: Predicted Collision Effects from the Worst-Case Design for the Bellrock Wind Farm Infrastructure on the St Kilda SPA Gannet Population

Seasonal Period	Estimated Number of Collisions	
	Breeding Adults	Subadults
Breeding	0.556	0.017
Autumn passage	0.064	0.104
Spring passage	0.000	0.000
Annual total	0.621	0.121

1866. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from the predicted collision mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.3.4 Combined Collisions and Displacement/Barrier Effects

1867. When treated as additive, the combined effects of collisions and displacement give a predicted additional annual mortality of between 0.73 and 0.95 adult and 0.19 and 0.33 subadult birds, depending on whether the lower or upper estimates of displacement mortality are assumed. This potential additional mortality of adult birds represents 0.0006% to 0.0008% of the current adult breeding population at this colony (i.e. 118,410 individuals) (Table 2.4 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential combined collision and displacement mortality represents a small increase in baseline mortality levels (i.e. without any wind farm impacts), which is less than the 0.02 percentage point increase which NatureScot considers requires further

investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), this additional mortality equates to an increase of 0.007% to 0.011%, depending on the lower or upper estimate.

1868. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from the combined predicted collision and displacement mortality associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.3.5 Changes to Prey Availability

1869. The assessment of the potential effects of changes to prey availability during the O&M phase on the St Kilda SPA gannet population is essentially as for the Forth Islands SPA gannet population, noting that the St Kilda SPA is considerably further from the Bellrock WFDA than is the Forth Islands SPA and that modelling of foraging distributions from tracking data suggest that there should be little usage of the Bellrock WFDA during the breeding season by gannets from the St Kilda SPA (Wakefield et al. 2013).
1870. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Forth Islands SPA gannet population are presented in **Section 4.4.5.5.2.3**. On the basis of these details as applied to the St Kilda SPA gannet population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the St Kilda SPA gannet population.

4.4.20.2.4 Project Alone Conclusion

1871. The potential effects from the Bellrock Wind Farm Infrastructure alone on the St Kilda SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population.

4.4.20.2.5 Effects In-combination

4.4.20.2.5.1 Effects of Relevance to the In-combination Assessment

1872. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the St Kilda SPA gannet population during construction and decommissioning and resulting from disturbance and changes to prey availability during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.
1873. Therefore, the potential for effects of the Bellrock WFDA to act on the St Kilda SPA gannet population in-combination with other plans and projects is limited to the displacement (inclusive of barrier effects) and collision risk effect pathways during O&M.

4.4.20.2.5.2 Displacement/Barrier Effects – Operation and Maintenance

1874. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the St Kilda SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.5.2**). This was as agreed by NatureScot (**Table 1.1**).
1875. Lower and upper levels of mortality were derived for the other plans and projects using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.245**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1876. Full details of the displacement mortality estimates for the St Kilda SPA gannet population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.247**).

Table 4.247: Potential Annual Mortality of St Kilda SPA Gannet due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	0.69	0.21
	Upper mortality estimate	2.06	0.64
Including Berwick Bank Wind Farm	Lower mortality estimate	0.69	0.21
	Upper mortality estimate	2.06	0.64
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period.			

1877. The potential mortality on the SPA gannet population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Regardless of whether or not the Berwick Bank Wind Farm effects are included, the potential mortality ranges from 0.69 to 2.06 adult birds and from 0.21 to 0.64 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.247**).

1878. In terms of the additional annual mortality of adult birds, these estimates represent 0.0001% (lower estimate) to 0.0002% (upper estimate) of the current adult breeding population at this colony (i.e. 118,410 individuals), irrespective of whether the Berwick Bank Wind Farm effects are included or not (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Neither the lower nor upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.007% to 0.021%.
1879. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from displacement mortality associated with the Bellrock Wind Farm Infrastructure in combination with other plans and projects during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.5.3 Collision Risk – Operation and Maintenance

1880. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the collision mortality attributed to the St Kilda SPA gannet population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project (as outlined for the Forth Islands SPA gannet population in **Section 4.4.5.2.5.3**). This was as agreed by NatureScot (**Table 1.1**).
1881. Details of the NEEOG Interim CEF collision totals are summarised in **Section 4.4.1.2.5.3** for the Buchan Ness to Collieston Coast SPA kittiwake population. As stated in **Section 4.4.1.2.5.3**, the Interim CEF collision totals incorporated updates to the model avoidance rates which, for gannet, included application of the recommended macro-avoidance rate to the non-breeding period estimates (NatureScot, 2025). In accordance with NatureScot advice, the potential collision mortality from the other plans and projects was calculated for scenarios which included and excluded the collision estimate for the Berwick Bank Wind Farm (**Table 1.1**).
1882. Full details of the collision estimates for the St Kilda SPA gannet population resulting from the other plans and projects are provided in **Annex B** of **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential collision estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.248**).

Table 4.248: Potential Annual Mortality of St Kilda SPA Gannets due to Collisions at the Bellrock Wind Farm Infrastructure In-Combination with the Potential Collision Mortality from Other Plans and Projects

In-combination Scenario	Additional Annual Mortality	
	Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	2.41	0.41
Including Berwick Bank Wind Farm	2.41	0.41

1883. The potential mortality on the SPA gannet population resulting from the collisions associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is 2.41 breeding adult birds and 0.41 subadult birds, regardless of whether or not the Berwick Bank Wind Farm is included (**Table 4.248**).
1884. In terms of the additional annual mortality of adult birds, these estimates represent 0.0020% of the current adult breeding population at this colony (i.e. 118,410 individuals) irrespective of whether the Berwick Bank Wind Farm estimate is included or not (Table 2.6 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Neither the lower nor upper estimates of the potential collision mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.025%.
1885. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.5.4 Combined Collisions and Displacement/Barrier Effects – Operation and Maintenance

1886. The potential mortality attributed to the St Kilda SPA gannet population due to the combined effects of displacement and collisions from the Bellrock Wind Farm Infrastructure in-combination with other plans and projects is presented in **Table 4.249**. These estimates are derived from the displacement and collision mortality estimates presented in **Section 4.4.20.2.5.2** and **Section 4.4.20.2.5.3** above and incorporate both the lower and upper levels of displacement mortality.

Table 4.249: Potential Annual Mortality of St Kilda SPA Gannets due to the Combined Effects of Displacement and Collisions for the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality ²	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	3.10	0.63
	Upper mortality estimate	4.47	1.05
Including Berwick Bank Wind Farm	Lower mortality estimate	3.10	0.63
	Upper mortality estimate	4.47	1.05
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 1%, respectively, in each seasonal period. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 70% and 3%, respectively, in each seasonal period. ² Values may differ slightly from the sum of the analogous displacement and collision mortality estimates from Table 4.245 and Table 4.247: due to rounding errors.			

1887. Regardless of whether or not the Berwick Bank Wind Farm effects are included or not, the potential mortality on the SPA gannet population resulting from the combined potential displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects ranges from 3 to 4 breeding adult birds and 0.63 to 1.05 subadult birds (according to whether the lower or upper ranges of the displacement mortality rates are used). These estimates represent 0.0026% (lower estimate) to 0.0038% (upper estimate) of the current adult breeding population at this colony (i.e. 118,410 individuals) (Table 2.7 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, neither the lower nor upper estimates of the potential combined displacement and collisions mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.081 – see Table 2.12 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.032% to 0.047%.
1888. Based upon the above, the potential levels of impact on the St Kilda SPA gannet population resulting from the combined displacement and collision mortality associated with the Bellrock Wind Farm Infrastructure in-combination with other plans and projects during the O&M phase are considered to be small and inconsequential in population terms.

4.4.20.2.6 In-combination Conclusion

1889. The combined potential displacement and collision mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the St Kilda SPA gannet population are predicted to be small, and below a level at which the resultant additional mortality would lead to any discernible impacts on the population.
1890. Consequently, it is concluded that there is no potential for an adverse effect on the St Kilda SPA gannet population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. As has been outlined in **Section 4.2.2**, this conclusion is reached within the context of the precautionary assumptions incorporated into the assessment of SPA gannet populations and the risk of gross overestimation of impacts due to the approach of combining precaution into multiple discrete elements of the assessment.

4.4.20.3 Assessment for the Breeding Seabird Assemblage

1891. The breeding seabird assemblage for the St Kilda SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 600,000 individual seabirds). Gannet is one of 10 species identified in the citation as having nationally important populations which contribute to the St Kilda SPA breeding seabird assemblage.
1892. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA gannet population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that gannet is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1893. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the St Kilda SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.20.4 Site Conclusion

1894. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the St Kilda SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the St Kilda SPA.

4.4.21 Mingulay and Berneray SPA

4.4.21.1 European Site Information and Conservation Objectives

1895. Mingulay and Berneray SPA consists of two adjacent islands at the southern end of the Outer Hebrides. It is located 452 km from the Bellrock WFDA. The islands are ringed by predominantly cliff and rocky coast and contain maritime and paramaritime vegetation. The SPA boundary

overlaps with the boundary of Mingulay and Berneray SSSI, and the seaward extension extends approximately 2 km into the marine environment, including the seabed, water column and surface. The SPA was classified in 1994, with the seaward extension classified in 2009.

1896. Mingulay and Berneray SPA qualifies under Article 4.2 by regularly supporting a population of European importance of one migratory species, and by regularly supporting in excess of 20,000 individual seabirds, including five species named only as component species (**Table 4.250**). The potential for LSE has been identified in relation to one of the six qualifying species (**Table 4.250**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1897. The conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot (2025)) are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
1898. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1899. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.250: Details on the Qualifying Features of the Mingulay and Berneray SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable maintained	105,000 individuals	Yes
Fulmar ¹	Breeding	Unfavourable, no change	10,450 pairs	No
Kittiwake ¹	Breeding	Unfavourable declining	8,600 pairs	No
Guillemot ¹	Breeding	Favourable maintained	30,900 individuals	No
Puffin ¹	Breeding	Unfavourable declining	4,000 pairs	No
Razorbill	Breeding	Favourable maintained	16,890 individuals	Yes
Shag ¹	Breeding	Unfavourable, no change	720 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.21.2 Assessment for the Razorbill Population

1900. The Mingulay and Berneray SPA razorbill population is currently estimated to number 26,787 individuals, based upon the most recently available count data the Seabird Count (2015-2021) (JNCC and BTO, 2025). The seabird 2000 count estimated 22,904 individuals (30,691 with correction applied). This is substantially higher than the citation level of 16,890 individuals (Table 4.250).

4.4.21.2.1 The Potential for Impacts on the Razorbill Population

1901. The Bellrock WFDA plus 2 km buffer does not overlap with the Mingulay and Berneray SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
1902. At a distance of 655 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Mingulay and Berneray SPA is well beyond the mean maximum plus one standard deviation of the breeding season foraging range for razorbill, which is the metric used to determine breeding season connectivity (RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI), Woodward et al. 2019, NatureScot, 2023a). Consequently, there are deemed to be no breeding season impacts on the razorbill population from the Mingulay and Berneray SPA.
1903. In the non-breeding periods razorbills tend to move to central areas of the North Sea towards Scandinavia (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Mingulay and Berneray SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods when travelling to and from their wintering areas (defined as mid-August to October for autumn, November to December for winter and January to March for

spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).

1904. Given the above, the Bellrock WFDA may have potential effects on Mingulay and Berneray SPA razorbill population during non-breeding periods only.

4.4.21.2.2 Project Alone: Construction and Decommissioning

4.4.21.2.2.1 Disturbance

1905. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Mingulay and Berneray SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Mingulay and Berneray SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed.
1906. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the Mingulay and Berneray SPA razorbill population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.21.2.2.2 Displacement

1907. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Mingulay and Berneray SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Mingulay and Berneray SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1908. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the Mingulay and Berneray SPA razorbill population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.21.2.2.3 Changes to Prey Availability

1909. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Mingulay and Berneray SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Mingulay and Berneray SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1910. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the Mingulay and Berneray SPA razorbill population, it is considered that there is no potential for changes in prey

availability during the construction or decommissioning phases to lead to an adverse effect on the Mingulay and Berneray SPA razorbill population.

4.4.21.2.3 Project Alone: Operation and Maintenance

4.4.21.2.3.1 Disturbance

1911. The assessment of the potential effects of disturbance during the O&M phase on the Mingulay and Berneray SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population (**Section 4.4.2.3.2.1**), except that the Mingulay and Berneray SPA razorbill population is only being assessed in the non-breeding periods.
1912. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness *et al.* 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward *et al.* 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Mingulay and Berneray SPA razorbill population.

4.4.21.2.3.2 Displacement/Barrier Effects

1913. The potential effects of displacement and barrier effects during the O&M phase on the Mingulay and Berneray SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.1.2.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.251**). The resultant seasonal mortality estimates were then apportioned to the Mingulay and Berneray SPA and to the adult and subadult age classes, for non-breeding periods only, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.251**.

Table 4.251: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Mingulay and Berneray SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	0	0	0.07
Autumn passage	0	N/A	0.001	0.001	N/A
Winter	6	N/A	0.009	0.003	N/A
Spring passage	82	N/A	0.001	0.001	N/A

1914. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Mingulay and Berneray SPA razorbill population as a result of displacement is estimated to be

zero to 0.002 breeding adult birds and 0.001 to 0.003 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.252**). As detailed above, 100% of the potential mortality from displacement is predicted to occur during the non-breeding periods.

Table 4.252: Potential Annual Mortality of Mingulay and Berneray SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.000	0.001
	Annual total	-	-	0.000	0.001
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.001	0.000
	Spring passage	60%	3%	0.001	0.002
	Annual total	-	-	0.002	0.003

1915. The additional annual mortality of adult razorbills from the Mingulay and Berneray SPA population predicted due to displacement from the Bellrock WFDA essentially represents 0% (lower estimate and upper estimate) of the current adult breeding population at this colony (i.e. 26,787 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0% and 0.0001%.

1916. Based upon the above, the potential levels of impact on the Mingulay and Berneray SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.21.2.3.3 Secondary Entanglements

1917. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Mingulay and Berneray SPA).
1918. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Mingulay and Berneray SPA razorbill population as a result of secondary entanglement.

4.4.21.2.3.4 Changes to Prey Availability

1919. The assessment of the potential effects of changes to prey availability during the O&M phase on the Mingulay and Berneray SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Mingulay and Berneray SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1920. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the Mingulay and Berneray SPA razorbill population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Mingulay and Berneray SPA razorbill population.

4.4.21.2.4 Project Alone Conclusion

1921. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Mingulay and Berneray SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents considerably less than one hundredth of an adult bird and essentially 0% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Mingulay and Berneray SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.21.2.5 Effects In-combination

4.4.21.2.5.1 Effects of Relevance to the In-combination Assessment

1922. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Mingulay and Berneray SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways

to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

1923. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the Mingulay and Berneray SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.21.2.5.2 Displacement/Barrier Effects

1924. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Mingulay and Berneray SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
1925. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.252**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1926. Full details of the displacement mortality estimates for the Mingulay and Berneray SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.253**).

Table 4.253: Potential Annual Mortality of Mingulay and Berneray SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	2.76	1.77
	Upper mortality estimate	8.28	5.32
Including Berwick Bank Wind Farm	Lower mortality estimate	2.90	1.93
	Upper mortality estimate	8.71	5.78
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

1927. The potential mortality on the Mingulay and Berneray SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from three to eight adult birds and two to five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are three to nine adults and two to six subadults (**Table 4.253**). All mortality was attributed to the non-breeding periods.
1928. In terms of the additional annual mortality of adult birds, these estimates represent 0.01% (lower estimate) to 0.03% (upper estimate) of the current adult breeding population at this colony (i.e. 26,787 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.01% (lower estimate) to 0.03% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (Table 2.5 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, only the upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.10% to 0.29% (with the Berwick Bank Wind Farm effects excluded) and 0.10% to 0.31% (with the Berwick Bank Wind Farm effects included). The lower displacement mortality estimates do not represent more than a 0.02 percentage point increase, therefore PVAs have not been run for these scenarios.

1929. Given the above, PVAs were undertaken to assess the population-level impact only of the predicted upper displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.1.2.5.2** for the potential displacement mortality to the Buchan Ness to Collieston Coast SPA kittiwake population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.254: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Mingulay and Berneray SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	82,792	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Upper mortality estimate	82,011	1.0250	1.0000	0.9900	48.90
Including Berwick Bank	Upper mortality estimate	81,777	1.0250	1.0000	0.9890	48.60

1930. For the reasons given in **Section 4.4.4.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (with no potential for an adverse effect on the Mingulay and Berneray SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are as follows, the CPS value for the upper mortality estimate indicates a reduction of 1% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0% (**Table 4.254**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0% in the annual population growth rate.

1931. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Mingulay and Berneray SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 1% for the upper and lower mortality estimates (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.21.2.6 *In-combination Conclusion*

1932. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Mingulay and Berneray SPA razorbill population is predicted to cause the population to be up to 1% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Mingulay and Berneray SPA razorbill population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Mingulay and Berneray SPA razorbill population (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.21.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (considerably less than one hundredth of an adult bird, essentially representing 0% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1933. The small scale of the potential reduction in the size of the SPA population associated with the in-combination effects should also be considered within the context of a favourable maintained condition status and of a population which is currently substantially above the citation level (**Table 4.250**). Consequently, it is concluded that there is no potential for an adverse effect on the Mingulay and Berneray SPA razorbill population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.

4.4.21.3 **Assessment for the Breeding Seabird Assemblage**

1934. The breeding seabird assemblage for the Mingulay and Berneray SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 105,000 individual seabirds). Razorbill is one of six species identified in the citation as having nationally important populations which contribute to the Mingulay and Berneray SPA breeding seabird assemblage.
1935. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA razorbill population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA razorbill population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that razorbill is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1936. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Mingulay and Berneray SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.21.4 Site Conclusion

1937. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Mingulay and Berneray SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Mingulay and Berneray SPA.

4.4.22 Rathlin Island SPA

4.4.22.1 European Site Information and Conservation Objectives

1938. Rathlin Island is a large inhabited marine island situated some 4 km from the north Antrim coast of Northern Ireland. The SPA is situated approximately 409 km from the Bellrock WFDA. The SPA consists of marine cliffs and sea stacks along the coast of the island, as well as a marine extension into the surrounding marine environment. The SPA was classified in 1999.
1939. Rathlin Island SPA qualifies under Article 4.1 by regularly supporting a population of European importance of one Annex I species (**Table 4.255**). Rathlin Island SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 breeding seabirds, including eight species named only as component species (**Table 4.255**). The potential for LSE has been identified in relation to one of the nine qualifying species (**Table 4.255**), with the effect pathways associated with LSE detailed in **Table 2.1** and set out in the assessment below.
1940. The conservation objectives of this SPA (as determined through Rathlin SPA Guidance and Literature | Department of Agriculture, Environment and Rural Affairs) are:
- To:
 - Maintain or enhance the population of the qualifying species by sufficient fledging success;
 - Maintain or enhance the range of habitats utilised by the qualifying species;
 - Ensure that the integrity of the site is maintained; and
 - Ensure there is no significant disturbance of the species.
 - To ensure that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species; and
 - Structure, function and supporting processes of habitats supporting the species.
1941. The Bellrock WFDA does not overlap with the SPA, so that potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA.
1942. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because

the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 4.255: Details on the Qualifying Features of the Rathlin Island SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Seabird assemblage	Breeding	Favourable	66,000 individuals	Yes
Peregrine	Breeding	Unfavourable	6 pairs	No
Fulmar ¹	Breeding	Unavailable	1,482 pairs	No
Kittiwake ¹	Breeding	Favourable	6,822 pairs	No
Guillemot ¹	Breeding	Favourable	41,887 individuals	No
Puffin ¹	Breeding	Unavailable	2,398 individuals	No
Razorbill ¹	Breeding	Favourable	8,922 individuals	Yes
Herring gull ¹	Breeding	Unavailable	4,037 pairs	No
Lesser black-backed gull ¹	Breeding	Unavailable	155 pairs	No
Common gull ¹	Breeding	Unavailable	64 pairs	No
Notes:				
¹ Named component of the assemblage only.				

4.4.22.2 Assessment for the Razorbill Population

1943. The Rathlin Island SPA razorbill population is currently estimated to number 29,803 individuals, based upon the most recently available count data from 2021 (JNCC and BTO, 2025). The seabird 2000 count estimated 20,860 individuals and the more recent seabirds (Burnell et al. 2023). This is substantially higher than the citation level 8,922 individuals (**Table 4.255**).

4.4.22.2.1 The Potential for Impacts on the Razorbill Population

1944. The Bellrock WFDA plus 2 km buffer does not overlap with the Rathlin Island SPA, so that potential impacts on its razorbill population will only arise as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock WFDA. Consequently, the main focus of the assessment for this SPA population is concerned with the Conservation Objective *to maintain, in the long term, the population of the species as a viable component of the site*.
1945. At a distance of 818 km from the Bellrock WFDA (measured as the by-sea distance between the closest points), the Rathlin Island SPA is well beyond the mean maximum plus one standard deviation of the breeding season foraging range for razorbill, which is the metric used to determine breeding season connectivity (**RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**, Woodward et al. 2019, NatureScot, 2023a). Consequently, there are deemed to be no breeding season impacts on the razorbill population from the Rathlin Island SPA.

1946. In the non-breeding periods razorbills tend to move to central areas of the North Sea towards Scandinavia (Buckingham et al. 2022). Therefore, it is likely that there is potential for the birds from the Rathlin Island SPA razorbill population to pass through OWFs in the North Sea during the autumn and spring passage periods when travelling to and from their wintering areas (defined as mid-August to October for autumn, November to December for winter and January to March for spring, on the basis of applying the BDMPS defined periods within the context of the overall non-breeding period specified by NatureScot – Furness 2015, NatureScot, 2020, **Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**).
1947. Given the above, the Bellrock WFDA may have potential effects on Rathlin Island SPA razorbill population during non-breeding periods only.

4.4.22.2.2 Project Alone: Construction and Decommissioning

4.4.22.2.2.1 Disturbance

1948. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Rathlin Island SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Rathlin Island SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed.
1949. The details of the assessment of the potential effects of disturbance during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.1**. On the basis of these details as applied to the Rathlin Island SPA razorbill population, it is considered that there is no potential for construction or decommissioning related disturbance to lead to an adverse effect on the SPA razorbill population.

4.4.22.2.2.2 Displacement

1950. The assessment of the potential effects of disturbance during the construction and decommissioning phases on the Rathlin Island SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Rathlin Island SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1951. The details of the assessment of the potential effects of displacement during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.2**. On the basis of these details as applied to the Rathlin Island SPA razorbill population, it is considered that there is no potential for construction or decommissioning related displacement to lead to an adverse effect on the SPA razorbill population.

4.4.22.2.2.3 Changes to Prey Availability

1952. The assessment of the potential effects of changes to prey availability during the construction and decommissioning phases on the Rathlin Island SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Rathlin Island SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.

1953. The details of the assessment of the potential effects of changes in prey availability during the construction and decommissioning phases on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.2.3**. On the basis of these details as applied to the Rathlin Island SPA razorbill population, it is considered that there is no potential for changes in prey availability during the construction or decommissioning phases to lead to an adverse effect on the Rathlin Island SPA razorbill population.

4.4.22.2.3 *Project Alone: Operation and Maintenance*

4.4.22.2.3.1 Disturbance

1954. The assessment of the potential effects of disturbance during the O&M phase on the Rathlin Island SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Rathlin Island SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1955. Given the moderate sensitivity of razorbills to disturbance effects at sea (Garthe and Hüppop 2004; Furness *et al.* 2013, **Section 4.4.2.3.2.1**), the very small areas relative to the species' foraging range that will be subject intermittently to potentially disturbing activities (Woodward *et al.* 2019), and the fact that these potential effects will be reduced compared to the construction and decommissioning phases, it is considered that there is no potential for disturbance during O&M to lead to an adverse effect on the Rathlin Island SPA razorbill population.

4.4.22.2.3.2 Displacement/Barrier Effects

1956. The potential effects of displacement and barrier effects during the O&M phase on the Rathlin Island SPA razorbill population were assessed using the approach and methods outlined for the Fowlsheugh SPA razorbill population in **Section 4.4.2.3.3.2**. Thus, the displacement and mortality rates advised for razorbill by NatureScot (2023d) were applied to the mean peak population sizes of razorbill within the Bellrock WFDA and 2 km buffer for each seasonal period, as estimated from the baseline DAS (**Appendix 10.3: Offshore Ornithology Displacement Assessment Report (Volume IV)** and **Table 4.256**). The resultant seasonal mortality estimates were then apportioned to the Rathlin Island SPA and to the adult and subadult age classes, for non-breeding periods only, as detailed in **Appendix 10.5: Offshore Ornithology Apportioning Technical Report (Volume IV)** and summarised in **Table 4.256**.

Table 4.256: Razorbill Mean Peak Abundance Estimates for the Bellrock WFDA and 2 km Buffer in Each Seasonal Period, with the Rathlin Island SPA and Age Class Apportionment Estimates and Sabbatical Rate

Seasonal Period	Mean Peak Estimate (Individuals)	Proportion Adult Birds	SPA Apportionment		Proportion of Sabbatical Adults
			Adults	Subadults	
Breeding	1300	0.481	0	0	0.07
Autumn passage	0	N/A	0.001	0.002	N/A
Winter	6	N/A	0.007	0.000	N/A
Spring passage	82	N/A	0.001	0.002	N/A

1957. Based upon the estimates and assumptions detailed above, the potential annual mortality amongst the Rathlin Island SPA razorbill population as a result of displacement is estimated to be 0.001 to 0.003 breeding adult birds and 0.001 to 0.004 subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used (**Table 4.257**). As detailed above, 100% of the potential mortality from displacement is predicted to occur during the non-breeding periods.

Table 4.257: Potential Annual Mortality of Rathlin Island SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer

Approach	Seasonal Period	Displacement Rate	Mortality Rate	Additional Mortality	
				Breeding Adults	Subadults
Lower mortality estimate	Breeding	60%	3%	0.000	0.000
	Autumn passage	60%	1%	0.000	0.000
	Winter	60%	1%	0.000	0.000
	Spring passage	60%	1%	0.001	0.001
	Annual total	-	-	0.001	0.001
Upper mortality estimate	Breeding	60%	5%	0.000	0.000
	Autumn passage	60%	3%	0.000	0.000
	Winter	60%	3%	0.001	0.000
	Spring passage	60%	3%	0.002	0.004
	Annual total	-	-	0.003	0.004

1958. The additional annual mortality of adult razorbills from the Rathlin Island SPA population predicted due to displacement from the Bellrock WFDA represents 0% (lower estimate and upper estimate) of the current adult breeding population at this colony (i.e. 29,803 individuals) (Table 2.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Thus, the potential mortality from displacement represents a very small increase in baseline mortality levels (i.e. without any wind farm impacts), which is substantially less than the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see Table 2.9 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), the estimates of adult mortality equate to an increase of between 0% and 0.0001%.
1959. Based upon the above, the potential levels of impact on the Rathlin Island SPA razorbill population resulting from the mortality predicted from displacement and barrier effects associated with the Bellrock Wind Farm Infrastructure alone during the O&M phase are considered to be extremely small and inconsequential in population terms.

4.4.22.2.3.3 Secondary Entanglements

1960. During O&M, secondary entanglement poses a risk to diving seabirds, primarily auks, through scenarios that could arise from debris and ghost fishing gear getting caught on the mooring lines of the floating WTGs and associated infrastructure. The embedded maintenance and monitoring practices will be put in place to regularly inspect mooring lines of the floating WTGs and associated infrastructure, ensuring that any debris such as discarded fishing gear is collected and removed to reduce the risk of secondary entanglement for the relevant seabird species (including razorbill from the Rathlin Island SPA).
1961. With these measures in place, the likelihood of secondary entanglement will be low, and any resultant mortality will be minimal and inconsequential in population terms. Therefore, it is concluded that there is no potential for an adverse effect on the Rathlin Island SPA razorbill population as a result of secondary entanglement.

4.4.22.2.3.4 Changes to Prey Availability

1962. The assessment of the potential effects of changes to prey availability during the O&M phase on the Rathlin Island SPA razorbill population is essentially as for the Fowlsheugh SPA razorbill population, noting that the Rathlin Island SPA is beyond the distance for breeding season connectivity for razorbills and consequently, only non-breeding period impacts are being assessed in this section.
1963. The details of the assessment of the potential effects of changes in prey availability during the O&M phase on the Fowlsheugh SPA razorbill population are presented in **Section 4.4.2.3.3.4**. On the basis of these details as applied to the Rathlin Island SPA razorbill population, it is considered that there is no potential for changes in prey availability during the O&M phases to lead to an adverse effect on the Rathlin Island SPA razorbill population.

4.4.22.2.4 Project Alone Conclusion

1964. The potential effects from the Bellrock Wind Farm Infrastructure alone on the Rathlin Island SPA razorbill population are predicted to be extremely small and would be inconsequential in population terms. Given this, it is concluded that the effects from the Bellrock Wind Farm Infrastructure alone would not result in an adverse effect on this SPA population. Furthermore, given that the scale of the potential additional mortality represents considerably less than one hundredth of an adult bird and essentially 0% of the SPA population, it is considered biologically implausible that this could represent a meaningful addition to the in-combination effects from other plans and projects. Despite this conclusion, an in-combination assessment for the Rathlin Island SPA razorbill population, which incorporates the potential mortality predicted from the Bellrock WFDA, is presented below.

4.4.22.2.5 Effects In-combination

4.4.22.2.5.1 Effects of Relevance to the In-combination Assessment

1965. As detailed above, any effects from the Bellrock Wind Farm Infrastructure alone on the Rathlin Island SPA razorbill population during construction and decommissioning and resulting from disturbance, changes to prey availability and secondary entanglement during O&M will be small and highly localised. As such, there is considered to be no potential for these effect pathways to add to impacts at the population-level that might result from other effects pathways associated with the Bellrock Wind Farm Infrastructure or from the effects due to other plans and projects.

1966. It is also concluded that the potential mortality from the effects of displacement (inclusive of barrier effects) at the Bellrock WFDA during the O&M phase would not represent any meaningful addition to the in-combination effects from other plans and projects. However, for the purposes of undertaking and presenting a full in-combination assessment, the potential mortality from this effect pathway on the Rathlin Island SPA razorbill population is considered for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects.

4.4.22.2.5.2 Displacement/Barrier Effects

1967. As described in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, estimates of the displacement mortality attributed to the Rathlin Island SPA razorbill population as a result of other OWF projects which are in planning, consented, under construction or in operation were derived from the totals collated by the NEEOG Interim CEF project, using the most recently available update to these totals (i.e. April 2025). This was as agreed by NatureScot (**Table 1.1**).
1968. The NEEOG Interim CEF project totals provide SPA-specific displacement mortality estimates by seasonal period for both the breeding adult and subadult age classes. Lower and upper levels of mortality were derived using displacement and mortality rates which align with those used for estimating the potential displacement mortality for the Bellrock Wind Farm Infrastructure alone (see **Table 4.257**), and which follow NatureScot guidance (2023d). In accordance with NatureScot advice, the potential displacement mortality from the other plans and projects was calculated for scenarios which included and excluded the estimated mortality from the Berwick Bank Wind Farm (**Table 1.1**).
1969. Full details of the displacement mortality estimates for the Rathlin Island SPA razorbill population resulting from the other plans and projects are provided in **Annex B of Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**. The potential displacement mortality estimates for the other plans and projects were combined with those for the Bellrock Wind Farm Infrastructure alone to give the mortality estimates for the Bellrock Wind Farm Infrastructure In-combination with other plans and projects (**Table 4.258**).

Table 4.258: Potential Annual Mortality of Rathlin Island SPA Razorbill due to Displacement from the Bellrock WFDA and 2 km Buffer In-Combination with the Potential Displacement Mortality from Other Plans and Projects

In-combination Scenario	Approach ¹	Additional Annual Mortality	
		Breeding Adults	Subadults
Excluding Berwick Bank Wind Farm	Lower mortality estimate	2.47	1.40
	Upper mortality estimate	7.43	4.21
Including Berwick Bank Wind Farm	Lower mortality estimate	2.64	1.59
	Upper mortality estimate	7.91	4.78
Notes: ¹ Lower mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 3%/1% in breeding/non-breeding periods, respectively. Upper mortality estimates are based on rates of displacement and mortality amongst displaced birds of 60% and 5%/3% in breeding/non-breeding periods, respectively.			

1970. The potential mortality on the Rathlin Island SPA razorbill population resulting from the predicted displacement effects associated with the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects is one or two orders of magnitude greater than that for the Bellrock Wind Farm Infrastructure alone. Thus, with the Berwick Bank Wind Farm effects excluded, the potential mortality ranges from three to eight adult birds and two to five subadult birds, depending on whether the lower or upper ranges of the displacement mortality rates are used, whilst the equivalent mortality estimates with the Berwick Bank Wind Farm effects included are three to nine adults and two to six subadults (**Table 4.258**). All mortality was attributed to the non-breeding periods.
1971. In terms of the additional annual mortality of adult birds, these estimates represent 0.0083% (lower estimate) to 0.0249% (upper estimate) of the current adult breeding population at this colony (i.e. 29,803 individuals) with the Berwick Bank Wind Farm effects excluded, and 0.0088% (lower estimate) to 0.0265% (upper estimate) of the current adult breeding population with the Berwick Bank Wind Farm effects included (**Table 2.5 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), noting that the additional mortality expressed as a percentage of the population size equates to the percentage point increase in baseline mortality. Irrespective of whether the Berwick Bank Wind Farm effects are included or not, only the upper estimates of the potential displacement mortality represent increases in baseline mortality levels (i.e. without any wind farm impacts) which exceed the 0.02 percentage point increase which NatureScot considers requires further investigation using PVA (NatureScot, 2023e). In terms of percentage increases in the baseline annual adult mortality of the population (which is based on applying a mortality rate of 0.105 – see **Table 2.9 in Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**), these estimates of additional mortality equate to an increase of 0.079% to 0.237% (with the Berwick Bank Wind Farm effects excluded) and 0.084% to 0.253% (with the Berwick Bank Wind Farm effects included). The lower displacement mortality estimates do not represent more than a 0.02 percentage point increase, therefore PVAs have not been run for these scenarios.

1972. Given the above, PVAs were undertaken to assess the population-level impact only of the predicted upper displacement mortality of breeding adult and subadult age classes due to the Bellrock Wind Farm Infrastructure in-combination with the other plans and projects. The PVA modelling was undertaken, and outputs produced, as described in **Section 4.4.2.3.3.2** for the potential displacement mortality to the Fowlsheugh SPA razorbill population resulting from the Bellrock Wind Farm Infrastructure In-combination with other plans and projects. Full details of the approach and methods are presented in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**.

Table 4.259: Projected 35 Year Population Sizes, Growth Rates and PVA Metrics for the Rathlin Island SPA Razorbill Population due to the Potential Displacement Mortality from the Bellrock Wind Farm Infrastructure In-Combination with Other Plans and Projects

In-combination Scenario	Impact Scenario	Median Population Size	Annual Growth Rate (Median)	Median CPGR	Median CPS	Unimpacted Centile at Impacted 50 th Centile
Baseline (no impact)	N/A	92,130	1.0250	N/A	N/A	N/A
Excluding Berwick Bank	Upper mortality estimate	91,418	1.0250	1.0000	0.9920	49.00
Including Berwick Bank	Upper mortality estimate	91,361	1.0250	1.0000	0.9910	48.90

1973. For the reasons given in **Section 4.4.4.2.5.2** above, it is considered that the focus of this assessment should be on the outputs that include the predicted mortality from the Berwick Bank Wind Farm (with no potential for an adverse effect on the Rathlin Island SPA razorbill population concluded in relation to the Berwick Bank Wind Farm (Marine Directorate, 2025)). The predicted impacts for this in-combination scenario are as follows, the CPS value for the upper mortality estimate indicates a reduction of 1% in the size of the SPA population after 35 years, relative to the population size predicted to occur in the absence of any wind farm effects, whilst the associated reduction in annual population growth rate (as determined from the CPGR value) is 0% (**Table 4.259**). The metrics for the lower mortality estimates indicate reductions of 1% in the size of the SPA population after 35 years (relative to the population size predicted to occur in the absence of any wind farm effects), and of 0% in the annual population growth rate.
1974. As for the PVAs for the Buchan Ness to Collieston Coast SPA kittiwake population (**Section 4.4.1.2.5.2**, **Section 4.4.1.2.5.3** and **Section 4.4.1.2.5.4**), the additional PVAs for the displacement mortality to the Rathlin Island SPA razorbill population for the 50 year projections (which included a 15 year recovery period with no wind farm effects, following the 35 years of wind farm operation) gave very similar outputs to the 35 year projections. Thus, there were very small decreases in the predicted levels of impact, but the reduction in the size of the SPA population at the end of the projection period (relative to the population size predicted to occur in the absence of any wind farm effects) remained at 1% for the upper and lower mortality estimates (Table 3.2 in **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**).

4.4.22.2.6 *In-combination Conclusion*

1975. The potential displacement mortality due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects on the Rathlin Island SPA razorbill population is predicted to cause the population to be up to 1% smaller by the end of the 35 year operational period than it would be in the absence of any wind farm effects, if the upper level of displacement mortality is assumed. This is on the basis that the predicted mortality associated with the Berwick Bank Wind Farm is included in the in-combination effects because no adverse effect on the Rathlin Island SPA razorbill population was concluded in relation to the Berwick Bank Wind Farm and, therefore, there is no provision for compensation to offset the predicted mortality from this project on the Rathlin Island SPA razorbill population (Marine Directorate, 2025). Importantly, and as detailed in the conclusion for the Bellrock Wind Farm Infrastructure alone (**Section 4.4.22.2.4**), the contribution of the Bellrock WFDA to the predicted in-combination mortality is extremely small (considerably less than one hundredth of an adult bird, essentially representing 0% of the SPA population) and it is considered biologically implausible that this level of mortality could represent a meaningful addition to the in-combination effects.
1976. The small scale of the potential reduction in the size of the SPA population associated with the in-combination effects should also be considered within the context of a favourable condition status and of a population which is currently substantially above the citation level and has an overall increasing population trend (**Table 4.255**). Consequently, it is concluded that there is no potential for an adverse effect on the Rathlin Island SPA razorbill population as a result of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects. Furthermore, as noted above, the Bellrock WFDA is considered to make no meaningful contribution to the in-combination effects.

4.4.22.3 **Assessment for the Breeding Seabird Assemblage**

1977. The breeding seabird assemblage for the Rathlin Island SPA is a qualifying feature on the basis of the SPA supporting in excess of 20,000 individual seabirds (with the citation noting a total of 66,000 individual seabirds). Razorbill is one of eight species identified in the citation as having nationally important populations which contribute to the Rathlin Island SPA breeding seabird assemblage.
1978. Potential impacts from the Bellrock Wind Farm Infrastructure alone and in-combination with other plans and projects on the breeding seabird assemblage for the SPA could arise via effects on the individual species within the assemblage feature. However, in relation to the SPA razorbill population, no potential for an adverse effect is identified, either for the Bellrock Wind Farm Infrastructure alone or the Bellrock Wind Farm Infrastructure in-combination with other plans and projects (with the latter being irrespective of whether or not the potential additional mortality to the SPA razorbill population from the Bellrock WFDA is considered to represent a meaningful contribution to the in-combination impacts). The other species associated with this assemblage either have no connectivity with the Bellrock WFDA or else have been screened out on the basis of there being no pathway to effect, meaning that razorbill is the only named component of the breeding seabird assemblage qualifying feature which has been taken forward to Phase Two of the HRA process.
1979. Given the above, it is concluded that there is no potential for an adverse effect on the breeding seabird assemblage feature of the Rathlin Island SPA, either as a result of the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects.

4.4.22.4 Site Conclusion

1980. It is concluded that there is no potential for an adverse effect on the qualifying features (or named components of the seabird assemblage feature) of the Rathlin Island SPA due to the effects from the Bellrock Wind Farm Infrastructure alone or in-combination with other plans and projects. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of the Rathlin Island SPA.

4.5 Assessment of Potential Adverse Effect on Site Integrity: Migratory Non-Seabird SPAs

4.5.1 The SPAs and Pathways to Effect

1981. As set out in **Table 2.1** (and in the **RIAA Part 1: Appendix B - Bellrock WFDA HRA Screening Report (Volume VI)**), the potential for LSE was concluded in relation to the migratory non-seabird features of the following SPAs (and Ramsar sites):
- Ythan Estuary, Sands of Forvie and Meikle Loch SPA;
 - Loch of Strathbeg SPA and Ramsar site;
 - Montrose Basin SPA and Ramsar site;
 - Firth of Forth SPA and Ramsar site;
 - Firth of Tay and Eden Estuary SPA and Ramsar site;
 - Loch of Skene SPA and Ramsar site;
 - Loch Leven SPA and Ramsar site;
 - South Tayside Goose Roosts SPA and Ramsar site; and
 - River Spey – Insh Marshes SPA and Ramsar site.
1982. The potential for LSE for these SPAs (and Ramsar sites) arises in relation to the potential for collision and barrier effects to impact their migratory non-seabird qualifying features during their spring and/or autumn passage movements. The migratory non-seabird qualifying features from these nine SPAs (and Ramsar sites) comprise a total of 39 different species (or 41 if the three subspecies of dunlin are distinguished) (**Table 4.260**).
1983. As set out in **Section 4.3.1.2**, the potential for LSE as a result of collision and barrier effects was also identified for eight of the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA (**Table 2.1**). These eight qualifying features are all species which are also qualifying features of one or more of the above listed SPAs (and Ramsar sites). Given that the assessment for these SPAs (and Ramsar sites) is undertaken at the species level, the findings are also taken to apply to the Outer Firth of Forth and St Andrews Bay Complex SPA.

4.5.2 Approach to Collision Risk Assessment

1984. As described in **Appendix 1.1: Bellrock WFDA Scoping Report (Volume IV)**, the proposed approach to the assessment of potential collision effects on the migratory non-seabird qualifying features was to use the stochastic migratory CRM tool (mCRM), subject to review and if it became available in time for use in the current assessment. In the event of the mCRM not being available, the proposed alternative approach was to rely on the existing report on the strategic assessment of collision risk of Scottish OWFs to migrating birds (WWT, 2014) supplemented with qualitative assessment for any relevant species which are not included.
1985. At the time of writing, the mCRM is available as a Beta version only. To the Applicant's knowledge it has not yet been fully reviewed or endorsed for use in offshore wind farm assessments by NatureScot, and it is not yet incorporated into NatureScot guidance. However, the findings from a related work package which provides a review of birds migrating in Scottish waters have been published (Woodward et al. 2023), and provide updates on:
- Population estimates;
 - Migratory routes;
 - Timing of migration;
 - Migratory flight heights;
 - Migratory flight speeds; and
 - Avoidance behaviour and rates.
1986. The approach used to assess the potential collision effects on the migratory non-seabird features combined the approach used in WWT (2014) to estimate the proportion of each species' (or subspecies') migratory population that could (potentially) be at risk of collision from the Bellrock WFDA with elements of the updated information in Woodward et al. (2023), as has been undertaken in other recent Scottish OWF assessments (NIRAS/RPS, 2024, Natural Power Ltd, 2024, GoBe Consultants Ltd and HiDef Environmental Consultancy, 2024).
1987. Thus, the species-specific values recommended by Woodward et al. (2023) for; (i) the percentage of birds that fly at collision height (i.e. between the lower and upper rotor swept heights); and (ii) the avoidance rate, were combined to give an estimate of the percentage of the population that would be at potential risk of collision, based on the assumption that all birds from that population pass through the Bellrock WFDA during the passage periods. For those species (and subspecies) for which the estimated migratory front width is available from WWT (2014), the percentage of the population estimated to be at potential risk of collision was then amended to account for the fact that only a proportion (as opposed to all) of the population will actually fly through the Bellrock WFDA during their passage periods (based on the width of the Bellrock WFDA expressed as a proportion of the migratory front width).
1988. Amongst the 41 species (and subspecies) considered in **Table 4.260**, no recommended values for percentage of the population flying at collision height and the avoidance rate were available in Woodward et al. (2023) for either cormorant or Sandwich tern. Available flight height data for these two species suggest that the proportion of birds at the potential collision risk height (CRH) (defined

as 22 m to 300 m by Woodward et al. 2023) would be low but these data are unlikely to relate to birds on migration (Johnston et al. 2014 a, b, Fijn and Collier, 2022). Therefore, it was assumed that all birds would be at potential collision height on a (highly) precautionary basis. The avoidance rate for both species was taken as 0.9902, which is the recommended value for Sandwich tern (SNCBs, 2024). No recommended avoidance rate is available for cormorant but 0.9902 represents the lowest (and hence most precautionary) rate for various seabird species in relation to OWFs, and is also lower than the values recommended for divers, geese and swans (which are anatomically broadly similar species) in relation to the NatureScot collision risk model for onshore wind farms (NatureScot, 2017a).

4.5.3 Assessment of Collision Effects

1989. The recommended values for the percentage of birds flying at collision height and for the avoidance rate from Woodward et al. (2023) for each of the 41 species (and subspecies) are given in **Table 4.260**, along with the resultant estimated percentage at potential risk of collision. Where available, the values for the percentage of birds flying at collision height and the avoidance rate from WWT (2014) are also shown (for purposes of comparison), as is the estimated width of the migration corridor of the east coast population.
1990. For all species (and subspecies) for which data from WWT (2014) are available, the updated percentage at CRH increased or (rarely) remained the same compared to the values in WWT (2014). Notably, the updated values recommended for the percentage at CRH appear to be highly precautionary, being 100% for 35 of the 41 species (and subspecies). Data from some published studies on migratory birds in the Baltic Sea region indicate that many species, including common scoter, long-tailed duck, velvet scoter, mallard, cormorant, swan species, and great scaup, typically fly at heights of less than 20 m above the sea surface during their autumn and spring migrations (BC-Wind 2024, Baltic Power 2022). The updated avoidance rates also increased compared to the WWT (2014) values, with this change generally having a much greater effect on the percentage of the population estimated to be at potential risk of collision. As such, the updated values from Woodward et al. (2023) generally lead to a marked reduction in the percentage of the population estimated to be at potential risk of collision.
1991. For 27 of the 41 species (and subspecies), the percentage of the population estimated to be at collision risk is below 1%, whilst the maximum estimate for any species is 1.5%, even when these estimates are based on the highly unrealistic assumption that all birds in the population pass through the Bellrock WFDA. The WWT (2014) strategic assessment of collision risk to migratory birds used an indicative threshold of 1% of the passage population being impacted to inform which species were of concern, so that the majority of the species in **Table 4.260** do not meet this threshold, even without accounting for the proportion of the population that is likely to pass through the Bellrock WFDA.
1992. To estimate the proportion of a population that is likely to pass through the Bellrock WFDA during migration, it is necessary to consider the width of the WFDA relative to that of the migratory front of the population of interest. WWT (2014) gives estimates of the migratory front for east coast populations for 25 of the 41 species (and subspecies) in **Table 4.260** (noting that, for a given species, the estimates given in WWT (2014) for migratory front widths are smaller than for the migratory corridor widths used in Woodward et al. (2023)). The maximum width of the Bellrock WFDA is 36 km, whilst the average width as calculated for use in collision risk modelling is 19 km

(Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)). These values represent 2% to 3% of the widest migratory front and 5% to 10% of the narrowest migratory front given in **Table 4.260**. Therefore, accounting for the proportion of the population that is estimated to fly through the Bellrock WFDA (on the basis of the width of the Bellrock WFDA relative to the width of the migratory front) is likely to reduce the percentage of the population estimated to be at potential risk of collision by at least an order of magnitude. This is demonstrated in **Table 4.260** for the 25 species (and subspecies) for which an estimate of the migratory front width is available, using the more precautionary maximum (as opposed to average) width of the Bellrock WFDA.

1993. For a further three species (cormorant, red-throated diver and Sandwich tern), the majority of passage movements are likely to occur within 10 – 20 km of the coast (WWT, 2014), meaning that for these species, the assumption that all birds fly through the Bellrock WFDA during passage periods results in gross overestimation of the potential risk of collision (because the Bellrock WFDA is 116 km to the nearest point on the coast). Also, based on the information on migration corridors provided in Woodward et al. (2023), 12 of the remaining 13 species are likely to have relatively wide migratory fronts for east coast populations, with the exception (gadwall) having a narrow front well to the south of the Bellrock WFDA. Thus, the available data suggest that accounting for the width of the migratory front would have a similar effect on the percentage of the population estimated to be at potential risk of collision for these species (if equivalent data on the migratory front widths were available).
1994. For all species, the percentage of the population estimated to be at potential risk of collision would also reduce further if the ‘width’ of the rotor swept area (as opposed to the actual WFDA) relative to the migratory front was to be considered.
1995. Based on the above it is considered that for all 41 species (and subspecies) included in **Table 4.260**, the percentages of the east coast migratory populations which are at risk of collision from the Bellrock Wind Farm Infrastructure alone will be very small, representing a fraction of a percent in each case. Given this, it is concluded that there is no potential for an adverse effect on any of the migratory non-seabird qualifying features for which the potential for LSE was identified due to the Bellrock WFDA alone, whilst there is also no possibility that any such effects will be sufficient to make any meaningful contribution to an in-combination effect.
1996. The above conclusion also applies to the eight qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA for which the potential for LSE due to collision effects during the migratory periods was identified (**Table 2.1**).

Table 4.260: Recommended Values for the Percentage of Birds Flying at Collision Risk Height (CRH) and Avoidance Rates from WWT (2014) and as Updated in Woodward et al. (2023), for all 40 Species Screened into the Migratory Collision Risk Assessment, Together With the Estimated Width of the Migration Corridor of the East Coast Population (Where Available). The Percentage of the Population Estimated to be at Potential Risk of Collision is Presented Assuming that all Birds Fly Through the Bellrock WFDA and as Amended According to the Width of Migration Corridor

Species	Migration Front Width [km] (WWT, 2014)	Percentage at CRH (WWT, 2014)	Avoidance Rate (WWT, 2014)	Updated Percentage at CRH (Woodward et al. 2023)	Updated Avoidance Rate (Woodward et al. 2023)	Percentage of Population at Potential risk of Collision	
						All Birds Assumed to Fly Through the Bellrock WFDA ¹	With Account for Migratory Front Width ²
Common goldeneye	-	-	0.98	100%	0.9851	1.49%	-
Common scoter	1,140	1%	0.98	100%	0.9851	1.49%	0.05%
Eurasian teal	1,140	15%	0.98	100%	0.9851	1.49%	0.05%
Gadwall	-	-	0.98	100%	0.9851	1.49%	-
Goosander	-	-	0.98	100%	0.9851	1.49%	-
Hen harrier	872.1	50%	0.98	100%	0.9957	0.43%	0.02%
Long-tailed duck	1,104.1	15%	0.98	100%	0.9851	1.49%	0.05%
Mallard	-	-	0.98	100%	0.9851	1.49%	-
Pochard	445.4	15%	0.98	100%	0.9851	1.49%	0.12%
Red-breasted merganser	-	-	0.98	100%	0.9851	1.49%	-
Scaup	1,101.1	15%	0.98	100%	0.9851	1.49%	0.05%
Shoveler	-	-	0.98	100%	0.9851	1.49%	-

Species	Migration Front Width [km] (WWT, 2014)	Percentage at CRH (WWT, 2014)	Avoidance Rate (WWT, 2014)	Updated Percentage at CRH (Woodward et al. 2023)	Updated Avoidance Rate (Woodward et al. 2023)	Percentage of Population at Potential risk of Collision	
						All Birds Assumed to Fly Through the Bellrock WFDA ¹	With Account for Migratory Front Width ²
Tufted duck	1,134.6	15%	0.98	100%	0.9851	1.49%	0.05%
Velvet scoter	533.9	15%	0.99	100%	0.9851	1.49%	0.10%
Wigeon	1,140	15%	0.98	100%	0.9851	1.49%	0.05%
Cormorant ^{3, 4}	-	-	0.98	100%	0.9902	0.98%	-
Shelduck	-	-	0.98	50%	0.9851	0.75%	-
Whooper swan	622	50%	0.98	50%	0.9874	0.63%	0.04%
Great crested grebe	-	-	0.98	100%	0.9954	0.46%	-
Slavonian grebe	-	-	0.98	100%	0.9954	0.46%	-
Eider	-	-	0.98	25%	0.9851	0.37%	-
Red-throated diver ³	-	2%	0.98	25%	0.9954	0.12%	-
Bar-tailed godwit	520	25%	0.98	100%	0.9996	0.04%	0.00%
Black-tailed godwit	620	25%	0.98	100%	0.9996	0.04%	0.00%
Curlew breeding	380	25%	0.98	100%	0.9996	0.04%	0.00%
Curlew wintering	520	25%	0.98	100%	0.9996	0.04%	0.00%

Species	Migration Front Width [km] (WWT, 2014)	Percentage at CRH (WWT, 2014)	Avoidance Rate (WWT, 2014)	Updated Percentage at CRH (Woodward et al. 2023)	Updated Avoidance Rate (Woodward et al. 2023)	Percentage of Population at Potential risk of Collision	
						All Birds Assumed to Fly Through the Bellrock WFDA ¹	With Account for Migratory Front Width ²
Dunlin (<i>alpina</i>)	520	25%	0.98	100%	0.9996	0.04%	0.00%
Dunlin (<i>arctica</i>)	1,140	25%	0.98	100%	0.9996	0.04%	0.00%
Dunlin (<i>schinzii</i>)	620	25%	0.98	100%	0.9996	0.04%	0.00%
Golden plover	1,124.2	25%	0.98	100%	0.9996	0.04%	0.00%
Svalbard barnacle goose	513.7	30%	0.98	100%	0.9998	0.02%	0.00%
Knot	-	-	0.98	100%	0.9996	0.04%	-
Lapwing	-	-	0.98	100%	0.9996	0.04%	-
Oystercatcher	1,138.6	25%	0.98	100%	0.9996	0.04%	0.00%
Redshank (<i>totanus</i>)	520	25%	0.98	100%	0.9996	0.04%	0.00%
Ringed plover	-	-	0.98	100%	0.9996	0.04%	-
Sanderling	1,158	25%	0.98	100%	0.9996	0.04%	0.00%
Turnstone	1,165.8	25%	0.98	100%	0.9996	0.04%	0.00%
Grey plover	531	25%	0.98	100%	0.9996	0.04%	0.00%
Greylag goose	814.2	30%	0.98	50%	0.9996	0.02%	0.00%

Species	Migration Front Width [km] (WWT, 2014)	Percentage at CRH (WWT, 2014)	Avoidance Rate (WWT, 2014)	Updated Percentage at CRH (Woodward et al. 2023)	Updated Avoidance Rate (Woodward et al. 2023)	Percentage of Population at Potential risk of Collision	
						All Birds Assumed to Fly Through the Bellrock WFDA ¹	With Account for Migratory Front Width ²
Pink-footed goose	620.6	30%	0.98	50%	0.9999	0.00%	0.00%
Sandwich tern ^{3, 4}	-	-	0.98	100%	0.9902	0.98%	-

¹ Calculated solely from the Woodward et al. (2023) values for the percentage at CRH and the avoidance rate.

² Estimates as calculated by assuming all birds fly through the Bellrock WFDA are adjusted by the proportion that would be expected to fly through the Bellrock WFDA on the basis of the maximum width of the Bellrock WFDA (36 km) expressed as a proportion of the migratory front width.

³ No migration corridor, as such, is defined for cormorant, red-throated diver or Sandwich tern in WWT (2014) but it is assumed that the majority of migratory movements by these species occur within 10 km (cormorant and Sandwich tern) or 20 km (red-throated diver) of the coast. Therefore, the assumption that all birds fly through the Bellrock WFDA during passage periods gives a gross overestimation of the potential risk of collision for all three of these species.

⁴ Woodward et al. (2023) do not provide estimates of the percentage at CRH or the avoidance rate for these species. Therefore, 100% of flights are assumed to be at CRH on a precautionary basis, whilst the avoidance rate is derived from SNCBs (2024). See text for details.

4.5.4 Barrier Effect Assessment

1997. Birds are most at risk from operational disturbance and displacement effects when they are resident in an area, for example during the breeding season or wintering season, as opposed to passage or migratory seasons. Birds that are resident in an area may regularly encounter and be displaced by an offshore windfarm, for example during daily commuting trips to foraging areas from nest sites, whereas birds on passage may encounter (and potentially be displaced from) a particular offshore windfarm only once during a given migration journey.
1998. A barrier effect on migrating birds understood as an enforced detour around rather than through the windfarm development area of an offshore windfarm was not excluded as a potential impact in the assessment. Masden et al. (2010, 2012) and Speakman et al. (2009) calculated that the costs of one-off avoidances during migration were small, accounting for less than 2% of available fat reserves.
1999. Migratory routes do not have a fixed length and birds from the same population can cover slightly different distances depending, for example, on local weather conditions. A horizontal detour around Bellrock WFDA equates approximately to an additional 5 km distance, which is likely to be immaterial in the context of the distances covered by most bird species on their spring and autumn migrations. For example, for Barnacle geese migrating from Svalbard to Scotland flying ca 3100 km (Tombre et al. 2019, Shariatinajafabadi et al. 2014, Hübner et al. 2010) to and from their breeding sites in the Arctic, a potential enforced detour of 5 km adds less than 0.1% to the overall distance covered by the birds. This translates to an insignificant increase in energy expenditure during each seasonal migration.
2000. Therefore, the impacts of any barrier effects on bird populations that are migrating through the Bellrock WFDA site twice per year are negligible. Therefore, it is concluded that there is no potential for an adverse effect due to barrier effects on any of the migratory non-seabird qualifying features for which LSE was identified in relation to this effect pathway. There is also no possibility that barrier effects on these qualifying features due to the Bellrock WFDA could contribute in any meaningful way to an in-combination effect.
2001. The above conclusion also applies to the eight qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA for which the potential for LSE due to barrier effects during the migratory periods was identified (**Table 2.1**).

4.5.4.1 Conclusion for the Migratory Non-seabird Sites

2002. It is concluded that there is no potential for an adverse effect on the qualifying features of the nine SPAs (and Ramsar sites) for which LSE was identified on the basis of migratory non-seabird qualifying features. Consequently, it is concluded that there is no potential for an Adverse Effect on Site Integrity of these SPAs (and Ramsar sites).

5 Conclusion

2003. Of the 34 SPAs (and Ramsar sites) taken forward for Phase Two HRA assessment, no potential for an Adverse Effect on Site Integrity due to the Bellrock WFDA alone is identified. However, an Adverse Effect on Site Integrity due to the Bellrock Wind Farm Infrastructure in-combination with other plans and projects cannot be excluded in relation to the following seven SPAs:
- Buchan Ness to Collieston Coast;
 - Fowlsheugh;
 - Farne Islands;
 - Forth Islands;
 - Troup, Pennan and Lion's Heads;
 - East Caithness Cliffs; and
 - Flamborough and Filey Coast.
2004. The seven SPAs for which an Adverse Effect on Site Integrity cannot be excluded are all breeding seabird colony SPAs. No potential for an Adverse Effect on Site Integrity was identified in relation to the remaining 15 breeding seabird colony SPAs that were taken forward for Phase Two HRA assessment, which was also the case for the three marine SPAs and nine migratory non-seabird SPAs (and Ramsar sites) taken forward for Phase Two HRA assessment. In relation to the breeding seabird colony SPAs, changes have occurred in the predicted in-combination mortalities from the other plans and projects between the cut-off date for their inclusion in the assessments undertaken on these SPAs (i.e. the end of March 2025) and the submission of this assessment for the Bellrock WFDA, as outlined in **Section 3.4**. The extent of these changes is reviewed in **Appendix B: In-Combination Assessment Update (RIAA Part 3, Volume VI)**, which compares the predicted mortalities used in the in-combination assessments with the values based on the updates to these other plans and projects that have occurred between the end of March 2025 and February 2026. Based on these comparisons it is considered that the updates to the predicted in-combination mortalities would not affect the conclusion of the assessment for the Bellrock WFDA with regard to the breeding seabird colony SPAs for which an Adverse Effect on Site Integrity cannot be excluded (or in relation to the individual features of these SPAs for which an adverse effect cannot be excluded).
2005. For the seven SPAs for which an Adverse Effect on Site Integrity cannot be excluded, the Adverse Effect on Site Integrity is due solely to the effects of the Bellrock Wind Farm Infrastructure in-combination with other plans and projects in all instances (with no potential for an Adverse Effect on Site Integrity identified in relation to the Bellrock WFDA alone). The Adverse Effect on Site Integrity on these seven SPAs is associated with adverse effects on kittiwake in six cases (i.e. all except the Forth Islands SPA), razorbill in one (Fowlsheugh SPA), gannet in one (Forth Islands SPA) and the breeding seabird assemblage in one (Farne Islands SPA). The conclusions in relation to the breeding seabird colony SPAs are summarised in **Table 5.1** below.

2006. In relation to the qualifying features (or named components of the seabird assemblage qualifying feature) for which the potential for an adverse effect has been identified, in principle compensation has been proposed in the **Bellrock WFDA Derogation Case (Volume VI)**. In addition, it is recognised that Scottish Ministers could be minded reaching different conclusions regarding the SPAs (and associated qualifying features) for which an Adverse Effect on Site Integrity cannot be excluded. Therefore, the in principle compensation makes allowance, without prejudice, for additional compensation requirements for:
- SPAs identified in **Table 5.1** for which no potential for an Adverse Effect on Site Integrity is concluded but for which the determinations for the Berwick Bank, Green Volt, West of Orkney or Salamander projects were unable to exclude an Adverse Effect on Site Integrity; and
 - SPAs identified in **Table 5.1** for which the conclusion of no potential for an Adverse Effect on Site Integrity relies on the fact that the impacts from the Bellrock Wind Farm Infrastructure alone are considered to be so small as to make it biologically implausible for them to make a meaningful contribution to the in-combination effects.
2007. Further details on the proposed compensation measures are provided in the **Bellrock WFDA Shadow Habitats Regulations Appraisal Derogation Case (Volume VI)**.

This page is intentionally blank

Table 5.1: Summary of Conclusions of the Assessment for the 22 Breeding Seabird Colony SPAs Taken Forward for Phase Two of the HRA Assessment

SPA	Alone/In-combination	AEoSI for Site Overall	AEoSI for Qualifying Features and Named Components of Seabird Assemblage for Which LSE Cannot be Excluded					
			Kittiwake	Razorbill	Puffin	Gannet	Great Black-backed Gull	Seabird Assemblage
Buchan Ness to Collieston Coast	Alone	NO	NO	N/A	N/A	N/A	N/A	NO
	In-combination	YES	YES	N/A	N/A	N/A	N/A	NO
Fowlsheugh	Alone	NO	NO	NO	N/A	N/A	N/A	NO
	In-combination	YES	YES	YES	N/A	N/A	N/A	NO
St Abb's Head to Fast Castle	Alone	NO	NO	N/A	N/A	N/A	N/A	NO
	In-combination	NO	NO	N/A	N/A	N/A	N/A	NO
Farne Islands	Alone	NO	NO	N/A	NO	N/A	N/A	NO
	In-combination	YES	YES	N/A	NO	N/A	N/A	YES
Forth Islands	Alone	NO	NO	NO	NO	NO	N/A	NO
	In-combination	YES	NO	NO	NO	YES	N/A	NO
Troup, Pennan and Lion's Heads	Alone	NO	NO	NO	N/A	N/A	N/A	NO
	In-combination	YES	YES	NO	N/A	N/A	N/A	NO
Coquet Island	Alone	NO	N/A	N/A	NO	N/A	N/A	NO
	In-combination	NO	N/A	N/A	NO	N/A	N/A	NO

SPA	Alone/In-combination	AEoSI for Site Overall	AEoSI for Qualifying Features and Named Components of Seabird Assemblage for Which LSE Cannot be Excluded					
			Kittiwake	Razorbill	Puffin	Gannet	Great Black-backed Gull	Seabird Assemblage
East Caithness Cliffs	Alone	NO	NO	NO	N/A	N/A	NO	NO
	In-combination	YES	YES	NO	N/A	N/A	NO	NO
North Caithness Cliffs	Alone	NO	NO	NO	NO	N/A	N/A	NO
	In-combination	NO	NO	NO	NO	N/A	N/A	NO
Copinsay	Alone	NO	NO	N/A	N/A	N/A	NO	NO
	In-combination	NO	NO	N/A	N/A	N/A	NO	NO
Flamborough and Filey Coast	Alone	NO	NO	NO	N/A	NO	N/A	NO
	In-combination	YES	YES	NO	N/A	NO	N/A	NO
Hoy	Alone	NO	NO	N/A	N/A	N/A	N/A	NO
	In-combination	NO	NO	N/A	N/A	N/A	N/A	NO
Fair Isle	Alone	NO	NO	N/A	N/A	NO	N/A	NO
	In-combination	NO	NO	N/A	N/A	NO	N/A	NO
Calf of Eday	Alone	NO	N/A	N/A	N/A	N/A	NO	NO
	In-combination	NO	N/A	N/A	N/A	N/A	NO	NO
West Westray	Alone	NO	NO	N/A	N/A	N/A	N/A	NO

SPA	Alone/In-combination	AEoSI for Site Overall	AEoSI for Qualifying Features and Named Components of Seabird Assemblage for Which LSE Cannot be Excluded					
			Kittiwake	Razorbill	Puffin	Gannet	Great Black-backed Gull	Seabird Assemblage
	In-combination	NO	NO	N/A	N/A	N/A	N/A	NO
Sule Skerry and Sule Stack	Alone	NO	N/A	N/A	N/A	NO	N/A	NO
	In-combination	NO	N/A	N/A	N/A	NO	N/A	NO
Noss	Alone	NO	N/A	N/A	N/A	NO	N/A	NO
	In-combination	NO	N/A	N/A	N/A	NO	N/A	NO
North Rona and Sula Sgeir	Alone	NO	N/A	N/A	N/A	NO	N/A	NO
	In-combination	NO	N/A	N/A	N/A	NO	N/A	NO
Hermaness, Saxa Vord and Valla Field	Alone	NO	N/A	N/A	N/A	NO	N/A	NO
	In-combination	NO	N/A	N/A	N/A	NO	N/A	NO
St Kilda	Alone	NO	N/A	N/A	N/A	NO	N/A	NO
	In-combination	NO	N/A	N/A	N/A	NO	N/A	NO
Mingulay and Berneray	Alone	NO	N/A	NO	N/A	N/A	N/A	NO
	In-combination	NO	N/A	NO	N/A	N/A	N/A	NO
Rathlin Island	Alone	NO	N/A	NO	N/A	N/A	N/A	NO
	In-combination	NO	N/A	NO	N/A	N/A	N/A	NO

This page is intentionally blank

6 References

Anatec (2012). Regional Cumulative Shipping and Navigational Review – Outer Firth of Forth and Tay Wind Farm Developments. https://marine.gov.scot/sites/default/files/appendix_j2.pdf

APEM (2022a). Review of evidence to support auk displacement and mortality rates in relation to offshore wind farms. APEM Scientific Report P00007416. Ørsted.

APEM (2022b). Hornsea Project Four: Gannet displacement and mortality evidence review. <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010098/EN010098-001144-Hornsea%20Project%20Four%20-%20Other-%20G2.9%20Gannet%20Displacement%20and%20Mortality%20Evidence%20Review.pdf>

Atkinson, P.W. and Baillie, S.R. (2024). Jumping species and seasons – the spread and impact of highly pathogenic avian influenza on seabirds and waterbirds. *Bird Study*, 71, 289-292.

Banyard, A.C. Lean, F.Z.X. Robinson, C. Howie, F. et al. (2022). Detection of Highly Pathogenic Avian Influenza Virus H5N1 clade 2.3.4.4b in great skuas: a species of conservation concern in Great Britain. *Viruses*, 14, 212. <https://doi.org/10.3390/v14020212>.

Baltic Power (2022) Environmental Impact Assessment Report for the Baltic Power Offshore Wind Farm. Available at: <https://balticpower.pl/media/1171/environmental-impact-assessment-report-for-the-baltic-power-offshore-wind-farm.pdf>.

BC-Wind (2024) Environmental Impact Assessment Report for the BC-Wind Offshore Wind Farm – Update. Available at: <https://www.bc-wind.pl/wp-content/uploads/2025/08/Environmental-Impact-Assessment-Report-for-the-BC-Wind-Offshore-Wind-Farm-update.pdf>.

Bennett, S. Johnston, D.J. Langlois Lopez, S. O'Hanlon, N. et al. (2025). Flight heights, behaviours, distribution, and overlap with offshore wind farms of kittiwakes breeding at Buchan Ness to Collieston SPA in 2024. Interim second year report to Ørsted and NEEOG.

Black, J., Dean, B.J., Webb, A., Lewis, M., Okill, D. and Reid, J.B. (2015). Identification of important marine areas in the UK for red-throated divers (*Gavia stellata*) during the breeding season. JNCC Report No 541

Bogdanova, M.I. Regan, C. Gunn, C. Newell, M. et al. (2022). Seabird GPS tracking on the Isle of May, Fowlsheugh and St Abb's Head in 2021 in relation to offshore wind farms in the Forth/Tay region. Unpublished report to Nearth na Gaoithe Offshore Wind Limited and SSE Renewables.

Bogdanova, M.I. Regan, C. Whyte, K, Tapia-Harris, C. et al. (2025). Seabird GPS tracking in 2023 in relation to offshore wind farms in the Forth/Tay region. UK CEH, RSPB and BioSS report.

Burnell, D. Perkins, A.J. Newton, S.F. Bolton, M. Tierney, T.D. and Dunn, T.E. (2023). Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015 2021). Lynx Nature Books, Barcelona.

Calbrade, N.A. Birtles, G.A. Woodward, I.D. Feather, A. Hiza, B. Caulfield, E. Balmer, D.E. Peck, K. Wotton, S.R. Shaw, J.M. and Frost, T.M. (2025). *Waterbirds in the UK 2023/24: The Wetland Bird Survey and Goose & Swan Monitoring Programme*. BTO/RSPB/JNCC/NatureScot. Thetford. Available at: <https://app.bto.org/webs-reporting/principal.jsp>

Caneco (2022). CRM. Available at: <https://dmpstats.shinyapps.io/sCRM/>

Caulfield, E.B. Feather, A. Smith, J.A. Frost, T.M. & Woodward, I.D. (2025). Wetland Bird Survey Alerts 2021/2022: Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Scientific interest (ASSIs). BTO Research Report 786. BTO, Thetford. <https://www.bto.org/webs-alerts>

Clarkson, K. Aitken, D. Cope, R. and O'Hara, D. (2022), 'Flamborough and Filey Coast SPA: 2022 seabird colony count and population trends', RSPB.

Cleasby I.R. Owen E. Wilson L.J. and Bolton M. (2018). Combining habitat modelling and hotspot analysis to reveal the location of high density seabird areas across the UK: Technical Report. RSPB Research Report no. 63.

Coulson, J.C. (2011). *The Kittiwake*. T & AD Poyser, London.

Coulson, J.C. (2017). Productivity of the black-legged kittiwake *Rissa tridactyla* required to maintain numbers. *Bird Study*, 64, 84-89.

Dierschke, V. Furness, R. W. and Garthe, S. (2016). Seabirds and offshore wind farms in European waters: Avoidance and attraction. *Biological Conservation*, 202: 59-68.

Fijn, R.C. and Collier, M.C. (2022). Distribution and flight heights of Sandwich terns *Thalasseus sandvicensis* during different behaviours near wind farms in the Netherlands. *Bird Study*, 69, 53-58.

Fliessbach K.L. Borkenhagen K. Guse N. Markones N. Schwemmer P. and Garthe S. (2019) A Ship Traffic Disturbance Vulnerability Index for Northwest European Seabirds as a Tool for Marine Spatial Planning. *Front. Mar. Sci.* 6:192.

Fort, J. Pettex, E. Tremblay, Y. Lorentsen, S.-H. Garthe, S. Votier, S. Pons, J.-B. Siorat, F. Furness, R.W. Grecian, J.W. Bearhop, S. Montevecchi, W.A. and Grémillet, D. (2012). Meta-population evidence of oriented chain-migration in Northern gannets. *Frontiers in Ecology and the Environment*, 10, 237-242.

Frederiksen, M. Moe, B. Daunt, F. Phillips, R.A. et al. (2012). Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale. *Diversity and Distributions*, 18: 530-542.

Furness, R.W. and Birkhead, T.R. (1984). Seabird colony distributions suggest competition for food supplies during the breeding season. *Nature*, 311, 655-656.

Furness, R. W. Wade, H. M. & Masden, E. A. (2013). Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of Environmental Management*, 119, 56-66.

Furness, R.W. (2015). Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164.

Furness, R.W. Searle, K. Daunt, F. Jones, E. Delacombe, K. and Butler, A. (2025). Uncertainty and approaches to evaluating uncertainty (WP1). AssESs – Assessing the extent and significance of uncertainty in offshore wind assessments. The Carbon Trust.

Garthe, S. and Hüppop, O. (2004). Scaling Possible Adverse Effects of Marine Wind Farms on Seabirds: Developing and Applying a Vulnerability Index. *Journal of Applied Ecology*, 41, 724-734.

GoBe Consultants Ltd and HiDef Environmental Consultancy (2024). Muir Mhor offshore Wind Farm. Habitat Regulations Appraisal: Report to Inform Appropriate Assessment.

Goodship, N.M. and Furness, R.W. (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

GPS Nautical Charts (2026). Orkney Islands – Scapa Flow and Approaches marine chart - GB_GB40682B. Available at: <https://fishing-app.gpsnauticalcharts.com/i-boating-fishing-web-app/fishing-marine-charts-navigation.html?title=Orkney+Islands+-+Scapa+Flow+and+Approaches+boating+app#11.45/58.8643/-3.0411>

Graham, J. and Thompson, K. (2023). Approaches to monitoring wintering waterfowl in Marine Protected Areas - Moray Firth pilot study winter 2019/20. NatureScot Research Report 1281.

Harris, M. P. & Wanless, S. (2011). *The Puffin*. T & AD Poyser, London.

Harris, M. P. Daunt, F. Newell, M. Phillips, R.A. and Wanless, S. (2009). Wintering areas of adult Atlantic puffins *Fratercula arctica* from a North Sea colony as revealed by geolocation technology. *Marine Biology*, 157, 827-836.

Harris, M.P. Burton, E. Lewis, S. Tyndall, A. Nichol, C.J. Wade, T. and Wanless, S. (2023). Count of northern gannets on the Bass rock in June 2023. Available at: https://www.seabird.org/uploads/store/mediaupload/2181/file/Bass%20Rock%20Count%20Report_Final.pdf

Heinänen, S. Žydelis, R. Kleinschmidt, B. Dorsch, M. Burger, C. Morkūnas, J. Quillfeldt, P. and Nehls, G. (2020). Satellite telemetry and digital aerial surveys show strong displacement of red-throated divers (*Gavia stellata*) from offshore wind farms. *Marine environmental research*, 160, 104989.

HiDef (2024). Digital Video Aerial Surveys of Seabirds and Marine Megafauna Bellrock Offshore Wind Farm Development Area: 2-year Annual Report (March 2022 to February 2024).

Horswill, C. O'Brien, S.H. and Robinson, R.A. (2016). Density dependence and marine bird populations: are wind farm assessments precautionary? *Journal of Applied Ecology*, 54, 1406-1414.

Hübner, C. E. Tombre, I. M. Griffin, L. R. Loonen, M. J. J. E. Shimmings, P. and Jónsdóttir, I. S. (2010). The connectivity of spring stopover sites for geese heading to arctic breeding grounds. *Ardea*, 98(2), 145–154.

Jarrett, D. Cook, A. S. C. P. Woodward, I. Ross, K. Horswill, C. Dadam, D. & Humphreys, E.M. (2018). Short-Term Behavioural Responses of Wintering Waterbirds to Marine Activity: Quantifying the Sensitivity of Waterbird Species during the Non-Breeding Season to Marine Activities in Orkney and the Western Isles. *Scottish Marine and Freshwater Science*, 7, 9, 88pp.

Jessopp, M. J. Cronin, M. Doyle, T. K. Wilson, M. McQuatters-Gollop, A. Newton, S. and Phillips, R. A. (2013). Transatlantic migration by post-breeding puffins: a strategy to exploit a temporarily abundant food resource?. *Marine Biology*, 160(10), 2755-2762.

JNCC (2020). Outer Firth of Forth and St Andrews Bay Complex SPA. <https://jncc.gov.uk/our-work/outer-firth-of-forth-and-st-andrews-bay-complex-spa/>

JNCC and BTO (2025). Seabird Monitoring Programme Online Database. Available at: <https://app.bto.org/seabirds/public/index.jsp>

Johnston, A. Cook, A.S. Wright, L.J. Humphreys, E.M. and Burton, N.H. (2014a). Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. *Journal of Applied Ecology*, 51(1), 31-41.

Johnston, A. Cook, A.S.C.P. Wright, L.J. Humphreys, E.M. and Burton, N.H.K. (2014b). Corrigendum: Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. *Journal of Applied Ecology* 51(4): 1126-1130.

Kober, K. Webb, A. Win, I. Lewis, M. O'Brien, S. Wilson, L. J. & Reid, J. B. (2010). An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs. JNCC report, 431.

Kubetzki, U. Garthe, S. Fifield, D. Mendel, B. and Furness, R.W. (2009). Individual migratory schedules and wintering areas of northern gannets. *Marine Ecology Progress Series*, 391, 257-265.

Lane, J. V. Jeavons, R. Deakin, Z. Sherley, R. B. Pollock, C. J. Wanless, R. J. and Hamer, K. C. (2020). Vulnerability of northern gannets to offshore wind farms; seasonal and sex-specific collision risk and demographic consequences. *Marine Environmental Research*, 162, 105196.

Lane, J.V. Jeglinski, J.W.E. Avery-Gomm, S. Ballstaedt, E. et al (2023). High pathogenicity avian influenza (H5N1) in northern gannets: Global spread, clinical signs, and demographic consequences. *Ibis*, 166, 633 – 650. Available at: <https://onlinelibrary.wiley.com/doi/10.1111/ibi.13275>

Lawson, J. Kober, K. Win, I. Bingham, C. Buxton, N.E. Mudge, G. Webb, A. Reid, J.B. Black, J. Way, L. & O'Brien, S. (2015). An assessment of numbers of wintering divers, seaduck and grebes in inshore marine areas of Scotland, (Revised 2018). JNCC Report 567, ISSN 0963-8091.

MacArthur Green (2019). Norfolk Vanguard Offshore Wind Farm: Offshore Ornithology. Precaution in Ornithological Assessment for Offshore Wind Farms. Vattenfall.

MacArthur Green (2023). West of Orkney Windfarm. Offshore Ornithology Technical Supporting Study 12. Annex 1P: Seabirds and highly pathogenic avian influenza. Available at: <https://www.westoforkney.com/application/files/6917/2795/2820/Annex-1P-Seabirds-and-Highly-Pathogenic-Avian-Influenza-a-Review.pdf>

Marine Directorate (2024). Scottish Ministers' Consideration of the Case for a Derogation Under the Conservation (Natural Habitat, &C.) Regulations 1994 and the Conservation of Offshore Marine Habitats and Species Regulations 2017. Application for Consent under section 36 of the Electricity Act 1989, and for Marine Licences Under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 for the Construction and Operation of Green Volt Offshore Wind Farm and Associated Transmission Infrastructure. Available at: https://marine.gov.scot/sites/default/files/240419_-_green_volt_-_eia_application_-_annex_e_-_derogation_case.pdf

Marine Directorate (2025). Scottish Ministers' Consideration of the Case for a Derogation Under the Conservation (Natural Habitat, &C.) Regulations 1994 and the Conservation of Offshore Marine Habitats and Species Regulations 2017. Application for Consent under section 36 of the Electricity Act 1989, and for Marine Licences Under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 for the Construction and Operation of Berwick Bank Wind Farm and Associated Transmission Infrastructure. Available at: https://marine.gov.scot/sites/default/files/berwick_bank_wind_farm_-_derogation_case_assessment_-_redaction.pdf

Marine Scotland (2025) National Marine Plan Interactive. Available at: <https://marinescotland.atkinsgeospatial.com/nmpi/>. Version 1.6.8.125.

Masden, E. A. Haydon, D. T. Fox, A. D. & Furness, R. W. (2010). Barriers to movement: Modelling energetic costs of avoiding marine wind farms amongst breeding seabirds. *Marine Pollution Bulletin*, 60(7), 1085–1091.

Masden, E. A. Reeve, R. Desholm, M. Fox, A. D. Furness, R. W. & Haydon, D. T. (2012). Assessing the impact of marine wind farms on birds through movement modelling. *Journal of the Royal Society Interface*, 9(74), 2120–2130.

Mitchell, S. F. Ratcliffe, N. & Dunn, T. E. (2004). Seabird populations in Britain and Ireland. PI.

Murray, S. Wanless, S. & Harris, M. (2014). The Bass Rock-now the world's largest Northern Gannet colony. *British Birds*, 107, 769-770.

Murray, S. Harris, M. P. & Wanless, S. (2015). The status of the gannet in Scotland in 2013-14. *Scottish Birds*, 35, 3-18.

Natural England (2020). Natural England's comments in relation to the Norfolk Boreas updated ornithological assessment, submitted at Deadline 2 [REP2-035]. PINS Ref REP4-040

Natural England (2022). Highly Pathogenic Avian Influenza (HPAI) outbreak in seabirds and Natural England advice on impact assessment (specifically relating to offshore wind)

Natural England (2023a). Designated Sites View – Farne Islands SPA.

<https://designatedsites.naturalengland.org.uk/ConservationAdvice/SupplementaryAdvice.aspx?SiteCode=UK9006021&SiteName=farne+islands&SiteNameDisplay=Farne+Islands+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=5>.

Natural England (2023b). Designated Sites View – Coquet Island SPA.

<https://designatedsites.naturalengland.org.uk/ConservationAdvice/SupplementaryAdvice.aspx?SiteCode=UK9006021&SiteName=farne+islands&SiteNameDisplay=Farne+Islands+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=5>.

Natural England (2023c). Designated Sites View – Flamborough and Filey Coast SPA.

<https://designatedsites.naturalengland.org.uk/ConservationAdvice/SupplementaryAdvice.aspx?SiteCode=UK9006021&SiteName=farne+islands&SiteNameDisplay=Farne+Islands+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=5>.

Natural Power Ltd (2024). Muir Mhor Offshore Wind Farm. Environmental Impact Assessment Report. Volume 3, Appendix 11.2: Offshore Ornithology Collision Risk Modelling Technical Report.

NatureScot (2017a). Avoidance rates for the onshore SNH wind farm collision risk model.

<https://www.nature.scot/sites/default/files/2018-01/Guidance%20-%20Avoidance%20rates%20guidance%20-%20table%20only.pdf>.

NatureScot. (2017b). Scottish Marine Wildlife Watching Code. Available at:

<https://www.nature.scot/professional-advice/land-and-sea-management/managing-coasts-and-seas/scottish-marine-wildlife-watching-code>.

NatureScot. (2017c). Guide to Best Practice for Watching Marine Wildlife. Available at:

<https://www.nature.scot/professional-advice/land-and-sea-management/managing-coasts-and-seas/scottish-marine-wildlife-watching-code>

NatureScot (2018). Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs. Available at:

<https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations>.

NatureScot (2020a). Citation for Special Protection Area (SPA): Moray Firth (UK9020313).

Available at: <https://www.nature.scot/sites/default/files/special-protection-area/10490/spa-citation.pdf>.

NatureScot (2020b). *Seasonal periods for birds in the Scottish marine environment*. Short

Guidance Note, vs. 2 <https://www.nature.scot/sites/default/files/2020-10/Guidance%20note%20->

[%20Seasonal%20definitions%20for%20birds%20in%20the%20Scottish%20Marine%20Environment.pdf](#).

NatureScot (2022a). Conservation and Management Advice: Moray Firth SPA (UK Site: 9020313). Available at: <https://www.nature.scot/sites/default/files/special-protection-area/10490/conservation-and-management-advice.pdf>.

NatureScot (2022b). Citation for Special Protection Area (SPA): Scapa Flow (UK9020321). Available at: <https://www.nature.scot/sites/default/files/special-protection-area/10510/spa-citation.pdf>

NatureScot (2022c). Conservation and Management Advice: Scapa Flow SPA (UK Site: 9020321). Available at: <https://www.nature.scot/sites/default/files/special-protection-area/10510/conservation-and-management-advice.pdf>

NatureScot (2023a). *Guidance Note 3: Guidance to Support Offshore Wind Applications: Marine Ornithology – Identifying theoretical connectivity with SPAs using breeding season foraging ranges*. Available at: <https://www.nature.scot/doc/guidance-note-3-guidance-support-offshore-wind-applications-marine-birds-identifying-theoretical>

NatureScot (2023b). *Guidance Note 6: Guidance to support Offshore Wind Applications - Marine Ornithology Impact Pathways for Offshore Wind Developments*. Available at: <https://www.nature.scot/doc/guidance-note-6-guidance-support-offshore-wind-applications-marine-ornithology-impact-pathways>.

NatureScot (2023c). *Guidance Note 7: Guidance to support Offshore Wind Applications: Marine Ornithology - Advice for assessing collision risk of marine birds*. Available at: <https://www.nature.scot/doc/guidance-note-7-guidance-support-offshore-wind-applications-marine-ornithology-advice-assessing>.

NatureScot (2023d). *Guidance Note 8: Guidance to support Offshore Wind Applications: Marine Ornithology Advice for assessing the distributional responses, displacement and barrier effects of Marine birds*. Available at: <https://www.nature.scot/doc/guidance-note-8-guidance-support-offshore-wind-applications-marine-ornithology-advice-assessing>

NatureScot (2023e) *Guidance Note 11: Guidance to Support Offshore Wind Applications: Marine Ornithology – Recommendations for Seabird Population Viability Analysis (PVA)*. Available at: <https://www.nature.scot/doc/guidance-note-11-guidance-support-offshore-wind-applications-marine-ornithology-recommendations>.

NatureScot (2023f) *Guidance Note 4: Guidance to Support Offshore Wind Applications: Ornithology – determining Connectivity of Marine Birds with Marine Special Protection Areas and Breeding Seabirds from Colony SPAs in the Non-Breeding Season*. Available at: <https://www.nature.scot/doc/guidance-note-4-guidance-support-offshore-wind-applications-ornithology-determining-connectivity>.

NatureScot (2024). Bellrock Offshore Windfarm – Scotwind E1E. NatureScot advice on the Environmental Impact Assessment (EIA) Scoping Report and Habitats Regulations Appraisal (HRA) Screening Report – wind farm development area only. Appendix C – Marine ornithology.

Available at: https://marine.gov.scot/sites/default/files/bellrock_wind_farm_development_area_-_scop_0043_-_appendix_1_-_consultation_responses_and_advice_-_august_2024.pdf.

NatureScot (2025). SiteLink. Available at: <https://sitelink.nature.scot/home>

NatureScot and JNCC (2022). Conservation and management advice: Outer Firth of Forth and St Andrews Bay Complex SPA. UK Site: 9020316. Available at:

<https://www.nature.scot/doc/guidance-note-7-guidance-support-offshore-wind-applications-marine-ornithology-advice-assessing>.

NIRAS/RPS (2024). Ossian Wind Farm. Assessment of Special Protection Areas and Ramsar Sites. Report to Inform Appropriate Assessment. Part 3.

Pavat, D. Harker, A.J. Humphries, G. Keogan, K. Webb, A. and Macleod, K. (2023). Consideration of avoidance behaviour of northern gannet (*Morus bassanus*) in collision risk modelling for offshore wind farm impact assessments. Natural England Commissioned Report 512. Natural England.

Peschko, V. Mendel, B. Mercker, M. Dierschke, J. and Garthe, S. (2021). Northern gannets (*Morus bassanus*) are strongly affected by operating offshore wind farms during the breeding season. *Journal of Environmental Management*, 279, 111509.

Peters-Grundy, R., Thompson, K., Humphries, G., Harvey, J., Semple, M., Tyler, K., Harker, A.J., Pavat, D., Thomson, R., Olley, N. and Macleod, K. (2026). Scapa Flow and North Orkney Special Protection Areas (SPAs) - Inshore wintering waterfowl surveys 2021/22 and 2022/2023. NatureScot Research Report 1340.

Scott, M.S. Humphries, G. Irwin, C. Peters-Grundy, R. Vilela, R. Southward, B. and Thompson, K. (2023). Inshore Wintering Waterfowl in Moray Firth Special Protection Area - 2019/20 digital aerial surveys and comparative analyses of aerial and shore-based surveys. NatureScot Research Report 1280.

Searle, K. Mobbs, D. Daunt, F. & Butler, A. (2019). A Population Viability Analysis Modelling Tool for Seabird Species. Centre for Ecology & Hydrology report for Natural England. Natural England Commissioned Report NECR274.

Shariatinajafabadi, M. Wang, T. Skidmore, A. K. Toxopeus, A. G. Kölzsch, A. Nolet, B. A. Exo, K. M. Griffin, L. Stahl, J. & Cabot, D. (2014). Migratory Herbivorous Waterfowl Track Satellite-Derived Green Wave Index. *PLOS ONE*, 9(9), e108331.

Smyth, K. Christie, N. Burdon, D. Atkins, J.P. Barnes, R. and Elliott, M. 2015. Renewables-to-reefs? – Decommissioning options for the offshore wind power industry. *Marine pollution bulletin*, 90(1-2), pp.247-258. SNCB (2014). Joint response from the Statutory Nature Conservation Bodies to the Marine Scotland Science avoidance rate review.

SNCBs (2022). *Joint SNCB Interim Displacement Advice Note*. Available at: <https://data.jncc.gov.uk/data/9aecb87c-80c5-4cfb-9102-39f0228dcc9a/joint-sncb-interim-displacement-advice-note-2022.pdf>.

SNCBs (2024). Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments. JNCC, Peterborough. <https://hub.jncc.gov.uk/f7892820-0f84-4e96-9eff-168f93bd343d>.

Speakman, J. Gray, H. & Furness, L. (2009) University of Aberdeen report on effects of offshore wind farms on the energy demands of seabirds. Report to the Department of Energy and Climate Change.

Stahl, J.T. and Oli, M.K. (2006). Relative importance of avian life-history variables to population growth rate. *Ecological Modelling*, 198, 23-39.

Stone, C. J. Webb, A. Barton, C. Ratcliffe, N. Reed, T. C. Tasker, M. L. & Pienkowski, M. W. (1995). An atlas of seabird distribution in northwest European waters.

Swann, B. (2016). Seabird counts at East Caithness Cliffs SPA for marine renewable casework. Scottish Natural Heritage Commissioned Report No. 902.

Swindells, M. (2019). Non-breeding movements of urban kittiwakes. *Seabird*, 32, pp. 33-45.

Tombre, I. M. Oudman, T. Shimmings, P. Griffin, L. & Prop, J. (2019). Northward range expansion in spring-staging barnacle geese is a response to climate change and population growth, mediated by individual experience. *Global Change Biology*, 25(11), 3680–3693.

Tremlett, C. J. Cleasby, I. R. Bolton, M. & Wilson, L. J. (2024a). Declines in UK breeding populations of seabird species of conservation concern following the outbreak of high pathogenicity avian influenza (HPAI) in 2021–2022. *Bird Study*, 71, 293-310.

Tremlett, C. J. Morley, N. and Wilson, L.J. (2024b). UK seabird colony counts in 2023 following the 2021-22 outbreak of Highly Pathogenic Avian Influenza. RSPB Research Report 76.

Trinder, M. O'Brien, S.H. and Deimel, J. (2024). A new method for quantifying redistribution of seabirds within operational offshore wind farms finds no evidence of within-wind farm displacement. *Frontiers in Marine Science*, 11, 1235061.

Waggitt, J. J. Evans, P. G. H. Andrade, J. Banks, A. N. Boisseau, O. Bolton, M. Bradbury, G. Brereton, T. Camphuysen, C. J. Durinck, J. Felce, T. Fijn, R. C. Garcia-Baron, I. Garthe, S. Geelhoed, S. C. V. Gilles, A. Goodall, M. Haelters, J. Hamilton, S. Hartny-Mills, L. Hodgins, N. James, K. Jessopp, M. Kavanagh A. S. Leopold, M. Lohrengel, K. Louzao, M. Markones, N. Martínez-Cedeira, J. Cadhla, O. Ó. Perry, S. L. Pierce, G. J. Ridoux, V. Robinson, K. P. Santos, M. B. Saavedra, C. Skov, H. Stienen, E. W. M. Sveegaard, S. Thompson, P. Vanerman, N. Wall, D. Webb, A. Wilson, J. Wanless, S. & Hiddink, J. G. (2020). Distribution maps of cetacean and seabird populations in the NorthEast Atlantic. *Journal of Applied Ecology*, 57(2), 253-269.

Wakefield, E. D. Bodey, T. W. Bearhop, S. Blackburn, J. Colhoun, K. Davies, R. et al. (2013). Space partitioning without territoriality in gannets. *Science*, 341(6141), 68-70.

Wakefield, E. D. Owen, E. Baer, J. Carroll, M. J. Daunt, F. Dodd, S. G. Green, J. A. Guildford, T. Mavor, R. A. Miller, P. I. Newell, M. A. Newton, S. F. Robertson, G. S. Shoji, A. Soanes, L. M. Votier, S. C. Wanless, S. and Bolton, M. (2017). Breeding density, fine-scale tracking, and large-

scale modeling reveal the regional distribution of four seabird species. *Ecological Applications*, 27(7), 2074-2091.

Wernham, C. V. Toms, M. P. Marchant, J. H. Clark, J. A. Siriwardena, G. M. & Baillie, S. R. (2002). *The Migration Atlas: movements of the birds of Britain and Ireland*. T & AD Poyser, London.

Wischnewski, S. Fox, D.S. McCluskie, A. and Wright, L.J. (2018). Seabird tracking at the Flamborough Head and Filey Coast: Assessing the impacts of offshore wind turbines. Pilot study 2017: Fieldwork and recommendations. Hornsea Project Three Offshore Wind Farm – Appendix 7 to Deadline 2 Submission.

Woodward, I. Bray, J. Marchant, J. Austin, J. & Calladine, J. (2015). A review of literature on the qualifying interest species of Special Protection Areas (SPAs) in the Firth of Forth and development related influences. Scottish Natural Heritage Commissioned Report No. 804.

Woodward, I. Thaxter, C. B. Owen, E. & Cook, A. S. C. P. (2019). Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report, 724.

Woodward, I.D. Franks, S.E. Bowgen, K. Davies, J.G. Green, R.M.W. Griffin, L.R. Mitchell, C. O'Hanlan, N. Pollock, C. Rees, E.C. Tremlett, C. Wright, L. and Cook, A.S.C.P. (2023). Strategic study of collision risk for birds on migration and further development of the stochastic collision risk modelling tool. Work Package 1: Strategic review of birds on migration in Scottish waters. Report to The Scottish Government, Crown Estate Scotland and The Crown Estate.

WWT (2014). Strategic Assessment of Collision Risk of Scottish Offshore Wind Farms to Migrating Birds. Scottish Marine and Freshwater Science Report.5(12).

Appendix A: European Site Information and Conservation Objectives: Migratory Non-seabird SPAs

This page is intentionally blank

Bellrock Offshore Wind Farm

Wind Farm Development Area

Report To Inform Appropriate Assessment - Volume VI

Part 3: Special Protection Area and Ramsar Assessments: Ornithology

**Appendix A: European Site Information and Conservation Objectives:
Migratory Non-seabird SPAs**

Document Number: RHDV_BEL_CST_REP_0023

Revision Number: 1

Classification: Public

Revision History

Rev.	Prepared By	Checked By	Approved By	Date
1	Haskoning	SA	BMcG	01/04/2026

This page is intentionally blank

Contents

1	Introduction	1
1.1	Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar Site.....	1
1.1.1	European Site Information and Conservation Objectives.....	1
1.2	Loch of Strathbeg SPA and Ramsar Site.....	3
1.2.1	European Site Information and Conservation Objectives.....	3
1.3	Montrose Basin SPA and Ramsar Site	5
1.3.1	European Site Information and Conservation Objectives.....	5
1.4	Firth of Forth SPA and Ramsar Site	7
1.4.1	European Site Information and Conservation Objectives.....	7
1.5	Firth of Tay and Eden Estuary SPA and Ramsar Site	9
1.5.1	European Site Information and Conservation Objectives.....	9
1.6	Loch of Skene SPA and Ramsar Site	11
1.6.1	European Site Information and Conservation Objectives.....	11
1.7	Loch Leven SPA and Ramsar Site	13
1.7.1	European Site Information and Conservation Objectives.....	13
1.8	South Tayside Goose Roosts SPA and Ramsar Site	14
1.8.1	European Site Information and Conservation Objectives.....	14
1.9	River Spey – Insh Marshes SPA and Ramsar Site.....	16
1.9.1	European Site Information and Conservation Objectives.....	16

List of Tables

Table 1.1:	Details on the Qualifying Features of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA	3
Table 1.2:	Details on the Qualifying Features of the Loch of Strathbeg SPA and Ramsar Site	4
Table 1.3:	Details on the Qualifying Features of the Montrose Basin SPA and Ramsar Site	6
Table 1.4:	Details on the Qualifying Features of the Firth of Forth SPA and Ramsar Site	8
Table 1.5:	Details on the Qualifying Features of the Firth of Tay and Eden Estuary SPA and Ramsar Site	10
Table 1.6:	Details on the Qualifying Features of the Loch of Skene SPA and Ramsar Site	12
Table 1.7:	Details on the Qualifying Features of the Loch Leven SPA and Ramsar Site	14
Table 1.8:	Details on the Qualifying Features of the South Tayside Goose Roosts SPA and Ramsar Site	15
Table 1.9:	Details on the Qualifying Features of the River Spey-Insh Marshes SPA and Ramsar Site	17

Glossary of Terminology

Term	Definition
Bellrock Offshore Wind Farm (or the Bellrock Project)	An offshore wind farm capable of exporting up to 1.8 GW of renewable energy to the National Electricity Transmission System. The Wind Farm Development Area is located 120 km east of Stonehaven, and will connect to the National Electricity Transmission System at the proposed SSEN Transmission Hurlie substation, west of Stonehaven in Aberdeenshire. The Bellrock Offshore Wind Farm comprises of the following Development Areas: ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Development Area	For consenting purposes, the area for which separate consents and/or Marine Licences will be sought by the Applicant, comprising: ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Likely Significant Effect	Meaning that there may be (as opposed to is likely to be) a significant effect of a proposal on the integrity of the site and its conservation objectives.
Offshore Transmission Development Area	The boundary within which the Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned (and includes the whole of the Wind Farm Development Area).
Onshore Transmission Development Area	The boundary within which the Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Development Area	The boundary within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Infrastructure	Infrastructure located within the Wind Farm Development Area including wind turbine generators; floating substructures, station keeping systems and associated scour protection; inter-array cables and associated cable protection; and subsea cable hubs; and ancillary infrastructure including buoys (including activities associated with the Wind Farm Infrastructure construction, operation and maintenance, and decommissioning).

Glossary of Abbreviations

Term	Definition
GB	Great Britain
HRA	Habitats Regulation Appraisal
km	Kilometres
LSE	Likely Significant Effect
RIAA	Report to Inform Appropriate Assessment
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
WFDA	Wind Farm Development Area

This page is intentionally blank

1 Introduction

1. This appendix sets out a summary of the European Site information and conservation objectives for each of the migratory non-seabird Special Protection Areas (SPAs) (and Ramsar sites when co-designated with SPAs) which are taken forward to Phase Two of the Habitats Regulation Appraisal (HRA) process in Section 4.5 of the **Bellrock Wind Farm Development Area (WFDA) Report to Inform Appropriate Assessment (RIAA) Part 3: Ornithology (Volume VI)**. For those European Sites that are designated as Ramsar sites as well as SPAs, it is assumed that this information is subsumed within that for the SPA designation.
2. The sites are:
 - Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar site;
 - Loch of Strathbeg SPA and Ramsar site;
 - Montrose Basin SPA and Ramsar site;
 - Firth of Forth SPA and Ramsar site;
 - Firth of Tay and Eden Estuary SPA and Ramsar site;
 - Loch of Skene SPA and Ramsar site;
 - Loch Leven SPA and Ramsar site;
 - South Tayside Goose Roosts SPA and Ramsar site; and
 - River Spey – Insh Marshes SPA and Ramsar site.

1.1 Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar Site

1.1.1 European Site Information and Conservation Objectives

3. Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar site were classified in 1998, with marine extension being later classified for the SPA in 2020. They cover a complex area in the northeast of Scotland that contains the long, narrow estuary of the River Ythan, the Sands of Forvie on the east bank of the estuary; the eutrophic Meikle Loch and a marine component covering the area between Aberdeen and Cruden Bay to the north. The marine extension of the SPA stretches approximately 3 kilometres (km) into the North Sea at its widest point.
4. The boundary of the Ramsar site is within the Ythan Estuary, Sands of Forvie and Meikle Loch SPA. It also generally follows the intertidal area of the Ythan Estuary, plus the southernmost tip of the Sands of Forvie, both within the Sands of Forvie and Ythan Estuary Site of Special Scientific Interest (SSSI), and the shores of Meikle Loch and Little Loch, within Meikle Loch and Kippit Hills

SSSI. The boundaries of the SPA follow those of Sands of Forvie and Ythan Estuary SSSI and the shore of Meikle Loch and Little Loch within Meikle Loch and Kippit Hills SSSI.

5. Ythan Estuary, Sands of Forvie and Meikle Loch SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: Sandwich tern (1989 to 1991, up to 1125 pairs, up to 7 % of the Great Britain (GB) population); common tern (1989 to 1993, up to 265 pairs, up to 2 % of the GB population); and little tern (1989 to 1993, up to 41 pairs, up to 2 % of the GB population). The marine component, immediately offshore of the terrestrial area forms the foraging zone for both Sandwich terns and little terns.
6. Ythan Estuary, Sands of Forvie and Meikle Loch SPA qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: pink-footed goose (1988/89 to 1992/93 winter peak mean of 17,213 individuals, 9 % of the Eastern Greenland/Iceland/United Kingdom (UK) biogeographic population) (**Table 1.1**). The SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl, named species in the assemblage include pink-footed goose, eider, redshank and lapwing.
7. The potential for Likely Significant Effect (LSE) has been identified in relation to the four qualifying non-seabird species (**Table 1.1**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
8. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
 - To ensure that the qualifying features are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
 - To ensure that the integrity of the SPA is restored in the context of environmental changes by meeting the following objectives for each qualifying feature:
 - The populations of the qualifying features are viable components of the site;
 - The distributions of the qualifying features throughout the site are maintained, or where appropriate restored, by avoiding significant disturbance of the species; and
 - The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Ythan Estuary, Sands of Forvie and Meikle Loch SPA.
9. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
10. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain or restore the populations of each qualifying feature because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.1: Details on the Qualifying Features of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable declining	51,265 individuals	Yes
Pink-footed goose	Non-breeding	Unfavourable no change	17,213 individuals	Yes
Eider ¹	Non-breeding	Unfavourable declining	1,860 individuals	Yes
Redshank ¹	Non-breeding	Favourable maintained	1,149 individuals	Yes
Lapwing ¹	Non-breeding	Unfavourable declining	2,542 individuals	Yes
Sandwich tern	Breeding	Favourable maintained	1,125 pairs	No
Little tern	Breeding	Favourable maintained	41 pairs	No
Common tern	Breeding	Favourable recovered	265 pairs	No
Notes:				
¹ Named component of the assemblage only.				

1.2 Loch of Strathbeg SPA and Ramsar Site

1.2.1 European Site Information and Conservation Objectives

11. Loch of Strathbeg SPA and Ramsar site were classified in 1995. Loch of Strathbeg SPA and Ramsar site are composed of a shallow freshwater loch with surrounding wetland, dune and grassland communities. It provides wintering habitat for a number of important wetland bird species, particularly wildfowl. The boundary of the Loch of Strathbeg SPA and Ramsar site coincide with one another, are contained within the Loch of Strathbeg Site of Special Scientific Interest and are located approximately 129 km from the Bellrock Wind Farm Development Area (WFDA).
12. Loch of Strathbeg SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: sandwich tern (1985 to 1990 an average of 280 pairs, 2.0 % of the GB population); whooper swan (a 5-year winter peak mean between 1986/87 and 1990/91 of 245 individuals, 4 % of the GB population) and Svalbard barnacle goose (a 5-year winter peak mean between 2005/06 and 2009/10 of 520 individuals, 1.6 % of the GB population). Loch of Strathbeg SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: pink-footed goose (1986/87 to 1990/91, average winter peak count of 27,500 individuals, 25 % of the Eastern Greenland/Iceland/UK biogeographic population); and greylag goose (1986/87 to 1990/91, average winter peak count of 5,565 individuals, 6 % of the Iceland/UK/Ireland biogeographic population). Additionally, the SPA also qualifies under Article 4.2 for regularly supporting in excess of 20,000 individual waterfowl including, populations of whooper swan, greylag goose, pink-footed goose and Svalbard barnacle goose as detailed above, as well

as teal (1,270 individuals, 1 % of the GB population) and goldeneye (150 individuals, 1 % of the GB population).

13. The potential for LSE has been identified in relation to six of the seven qualifying species (**Table 1.2**) with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
14. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
 - To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
15. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
16. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.2: Details on the Qualifying Features of the Loch of Strathbeg SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable declining	32,600 individuals	Yes
Whooper swan	Non-breeding	Favourable maintained	245 individuals	Yes
Barnacle goose	Non-breeding	Unfavourable declining	520 individuals	Yes
Pink-footed goose	Non-breeding	Favourable maintained	27,500 individuals	Yes
Greylag goose	Non-breeding	Unfavourable declining	5,565 individuals	Yes
Teal	Non-breeding	Favourable maintained	1,270 individuals	Yes
Goldeneye	Non-breeding	Not assessed	150 individuals	Yes

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Sandwich tern	Breeding	Unfavourable, no change	280 pairs	No
Notes:				
¹ Named component of the assemblage only.				

1.3 Montrose Basin SPA and Ramsar Site

1.3.1 European Site Information and Conservation Objectives

17. Montrose Basin SPA and Ramsar site were classified in 1995. Montrose Basin SPA and Ramsar site contains the enclosed estuary of the River South Esk on the east coast of Scotland, and Dun's Dish, a small eutrophic loch 4 km northwest of the Basin. It contains areas of mudflat, marsh and agricultural land and supports a diverse assemblage of wintering waterfowl of outstanding nature conservation and scientific importance. Dun's dish in particular forms an important roost site in winter for waterbirds from Montrose Basin. The boundaries of Montrose Basin SPA and Ramsar site follow those of Montrose Basin SSSI and Dun's Dish SSSI and is located approximately 144 km from the Bellrock WFDA.
18. Montrose Basin SPA qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: pink-footed goose (1987/88 to 1991/92, winter peak mean of 21,800 individuals, 9 % of the Eastern Greenland/Iceland/UK biogeographic population); greylag goose (1987/88 to 1991/92, winter peak mean of 1,080 individuals, 1 % of the Iceland/UK/Ireland biogeographic population); and redshank (1987/88 to 1991/92, winter peak mean of 2,240 individuals, 2 % of the East Atlantic biogeographic population). Additionally, the waterbird assemblage also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. The assemblage consists of the three migratory species named above, as well as oystercatcher (3,100 individuals, 1 % of the GB population); eider (2,240 individuals, 5 % of the GB population); wigeon (5,270 individuals, 2 % of the GB population); and knot (2,790 individuals, 1 % of the GB population). In the five-year period 1991/92 to 1995/96, a winter peak mean of 54,917 individual waterfowl was recorded with the assemblage additionally including a nationally important population greater than 2,000 individuals of dunlin (2,244 individuals, 0.4 % of the GB population). The assemblage additionally includes a nationally important population of shelduck (2005/06 to 2009/10, 1,069 wintering individuals, 1.8 % of the GB population).
19. The potential for LSE has been identified in relation to the all named qualifying species and the assemblage as a whole (**Table 1.3**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
20. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:

- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.

21. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.

22. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.3: Details on the Qualifying Features of the Montrose Basin SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable maintained	47,640 individuals	Yes
Pink-footed goose	Non-breeding	Favourable maintained	21,800 individuals	Yes
Greylag goose	Non-breeding	Favourable recovered	1,080 individuals	Yes
Redshank	Non-breeding	Favourable maintained	2,240 individuals	Yes
Oystercatcher ¹	Non-breeding	Favourable maintained	3,100 individuals	Yes
Eider ¹	Non-breeding	Favourable declining	2,240 individuals	Yes
Wigeon ¹	Non-breeding	Favourable maintained	5,270 individuals	Yes
Knot ¹	Non-breeding	Unfavourable declining	2,790 individuals	Yes
Dunlin ¹	Non-breeding	Not assessed	2,244 individuals	Yes
Shelduck ¹	Non-breeding	Not assessed	1,069 individuals	Yes
Notes:				
¹ Named component of the assemblage only.				

1.4 Firth of Forth SPA and Ramsar Site

1.4.1 European Site Information and Conservation Objectives

23. The Firth of Forth SPA and Ramsar site were classified in 2001. The Firth of Forth SPA and Ramsar site is a complex of estuarine and coastal habitats in southeast Scotland stretching from Alloa to the coasts of Fife and East Lothian. The site includes extensive invertebrate-rich intertidal flats and rocky shores, areas of saltmarsh, lagoons and sand dune. The boundary of the Firth of Forth SPA and Ramsar site are coincident with one another and mostly follow that of the Firth of Forth Site of Special Scientific Interest, slightly overlapping with the Forth Islands SPA and is located approximately 159 km from the Bellrock WFDA.
24. The Firth of Forth SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species (1993/94 to 1997/98 winter peak means): red-throated diver (90 individuals, 2 % of the GB population), Slavonian grebe (84 individuals, 21 % of the GB population), golden plover (2,949 individuals, 1 % of the GB population) and bar-tailed godwit (1,974 individuals, 4 % of the GB population). It also qualifies by regularly supporting a population of European importance of the Annex 1 species: sandwich tern *Sterna sandvicensis* during the passage period (a winter peak mean during the five-year period 1993/94 to 1997/98 of 1,617 individuals, 6 % of the GB population).
25. The Firth of Forth SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species (1993/94 to 1997/98 winter peak means): pink-footed goose (10,852 individuals, 6 % of the Eastern Greenland/Iceland/UK biogeographic population); shelduck (4,509 individuals, 2 % of the northwestern Europe biogeographic population); knot (9,258 individuals, 3 % of the northeastern Canada/Greenland/Iceland/northwestern Europe biogeographic population); redshank (4,341 individuals, 3 % of the Eastern Atlantic biogeographic population) and turnstone (860 individuals, 1 % of the Western Palearctic biogeographic population). It further qualifies by regularly supporting in excess of 20,000 individual waterfowl, of which the species detailed above are all included and species additional to those being detailed in **Table 1.4** below.
26. The potential for LSE has been identified in relation to the all named qualifying species and the assemblage as a whole (**Table 1.4**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
27. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
 - To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;

- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

28. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
29. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.4: Details on the Qualifying Features of the Firth of Forth SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable maintained	95,000 individuals	Yes
Red-throated diver	Non-breeding	Favourable maintained	90 individuals	Yes
Slavonian grebe	Non-breeding	Unfavourable declining	84 individuals	Yes
Golden plover	Non-breeding	Unfavourable declining	2,949 individuals	Yes
Bar-tailed godwit	Non-breeding	Favourable maintained	1,974 individuals	Yes
Sandwich tern	Passage	Favourable maintained	1,617 individuals	Yes
Pink-footed goose	Non-breeding	Favourable maintained	10,582 individuals	Yes
Shelduck	Non-breeding	Favourable maintained	4,509 individuals	Yes
Knot	Non-breeding	Unfavourable declining	9,258 individuals	Yes
Redshank	Non-breeding	Favourable maintained	4,341 individuals	Yes
Turnstone	Non-breeding	Favourable maintained	860 individuals	Yes
Scaup ¹	Non-breeding	Unfavourable declining	437 individuals	Yes
Great crested grebe ¹	Non-breeding	Unfavourable declining	720 individuals	Yes
Cormorant ¹	Non-breeding	Favourable maintained	682 individuals	Yes
Curlew ¹	Non-breeding	Favourable maintained	1,928 individuals	Yes
Eider ¹	Non-breeding	Favourable declining	9,400 individuals	Yes
Long-tailed duck ¹	Non-breeding	Unfavourable declining	1,045 individuals	Yes
Common scoter ¹	Non-breeding	Unfavourable declining	2,880 individuals	Yes
Velvet scoter ¹	Non-breeding	Favourable maintained	635 individuals	Yes

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Goldeneye	Non-breeding	Unfavourable declining	3,004 individuals	Yes
Red-breasted merganser ¹	Non-breeding	Unfavourable declining	670 individuals	Yes
Oystercatcher ¹	Non-breeding	Favourable maintained	7,846 individuals	Yes
Ringed plover ¹	Non-breeding	Favourable maintained	328 individuals	Yes
Grey plover ¹	Non-breeding	Favourable declining	724 individuals	Yes
Dunlin ¹	Non-breeding	Favourable declining	9,514 individuals	Yes
Mallard ¹	Non-breeding	Favourable declining	2,564 individuals	Yes
Lapwing ¹	Non-breeding	Favourable declining	4,148 individuals	Yes
Wigeon ¹	Non-breeding	Favourable maintained	2,139 individuals	Yes
Notes:				
¹ Named component of the assemblage only.				

1.5 Firth of Tay and Eden Estuary SPA and Ramsar Site

1.5.1 European Site Information and Conservation Objectives

30. The Firth of Tay and Eden Estuary SPA and Ramsar site were classified in 2000. The Firth of Tay and Eden Estuary SPA and Ramsar site is a complex of estuarine and coastal habitats in eastern Scotland from the mouth of the River Earn in the inner Firth of Tay, east to Barry Sands on the Angus coast and St Andrews on the Fife coast. The site includes extensive invertebrate rich intertidal flats and areas of reedbed, saltmarsh and sand dune. The boundary of the Firth of Tay and Eden Estuary SPA and Ramsar site are coincident with one another and are contained within the following Sites of Special Scientific Interest: Inner Tay Estuary, Monifieth Bay, Barry Links, Tayport Tentsmuir Coast and Eden Estuary. and is located approximately 160 km from the Bellrock WFDA.
31. The Firth of Tay and Eden Estuary SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex I species: marsh harrier (1992 to 1996, an average of 4 females, 3 % of the GB population); little tern (1993 to 1997, an average of 25 pairs, 1 % of the GB population) and bar-tailed godwit (1990/91 to 1994/95, a winter peak mean of 2,400 individuals, 5 % of the GB population).
32. The Firth of Tay and Eden Estuary SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: redshank (1990/91 to 1994/95, a winter peak mean of 1,800 individuals, 1 % of the Eastern Atlantic biogeographic population);

greylag goose (1990/91 to 1994/95 a winter peak mean of 1,200 individuals, 1 % of the Iceland/UK/Ireland biogeographic population) and pink-footed goose (1990/91 to 1994/95 a winter peak mean of 2,800 individuals, 1 % of the Eastern Greenland/Iceland/UK biogeographic population). It also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. This assemblage consists of the species already identified as qualifying under Article 4.2 and a range of other waterfowl species which are detailed in **Table 1.5** below.

33. The potential for LSE has been identified in relation to the 19 of the 21 named qualifying species and the assemblage as a whole (**Table 1.5**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
34. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
 - To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
35. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
36. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.5: Details on the Qualifying Features of the Firth of Tay and Eden Estuary SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable maintained	48,000 individuals	Yes
Marsh harrier	Breeding	Favourable maintained	4 females	No
Little tern	Breeding	Unfavourable, no change	25 pairs	No
Bar-tailed godwit	Non-breeding	Favourable declining	2,400 individuals	Yes

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Redshank	Non-breeding	Favourable declining	1,800 individuals	Yes
Greylag goose	Non-breeding	Unfavourable declining	1,200 individuals	Yes
Pink-footed goose	Non-breeding	Favourable recovered	2,800 individuals	Yes
Velvet scoter ¹	Non-breeding	Unfavourable declining	730 individuals	Yes
Common scoter ¹	Non-breeding	Unfavourable declining	3,100 individuals	Yes
Cormorant ¹	Non-breeding	Favourable maintained	230 individuals	Yes
Shelduck ¹	Non-breeding	Unfavourable declining	1,200 individuals	Yes
Eider ¹	Non-breeding	Favourable recovered	13,800 individuals	Yes
Black-tailed godwit ¹	Non-breeding	Favourable maintained	150 individuals	Yes
Goldeneye ¹	Non-breeding	Unfavourable declining	230 individuals	Yes
Red-breasted merganser ¹	Non-breeding	Unfavourable declining	470 individuals	Yes
Goosander ¹	Non-breeding	Favourable maintained	220 individuals	Yes
Oystercatcher ¹	Non-breeding	Favourable maintained	5,100 individuals	Yes
Grey plover ¹	Non-breeding	Favourable maintained	920 individuals	Yes
Sanderling ¹	Non-breeding	Favourable maintained	220 individuals	Yes
Dunlin ¹	Non-breeding	Favourable declining	5,200 individuals	Yes
Long-tailed duck ¹	Non-breeding	Unfavourable declining	560 individuals	Yes
Notes:				
¹ Named component of the assemblage only.				

1.6 Loch of Skene SPA and Ramsar Site

1.6.1 European Site Information and Conservation Objectives

37. The Loch of Skene SPA and Ramsar site was classified in 1986, with amendments being adopted in 2018 for the SPA and 2025 for the Ramsar site. Loch of Skene SPA is situated about 10 km west of Aberdeen. It is a shallow eutrophic lowland loch surrounded by fringing reedbeds and birch-willow carr. The boundary of the Firth of Tay and Eden Estuary SPA and Ramsar site are coincident with the Loch of Skene Site of Special Scientific Interest and is located approximately 135 km from the Bellrock WFDA.

38. The Loch of Skene SPA qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: greylag goose (an average of 5,500 individuals, over 5 % of the Iceland/UK/Ireland biogeographic population), goldeneye (150 individuals, 1 % of the GB population) and goosander (110 individuals, over 2 % of the GB population). The potential for LSE has been identified in relation to all three of the qualifying species (**Table 1.6**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
39. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
40. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
41. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.6: Details on the Qualifying Features of the Loch of Skene SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Greylag goose	Non-breeding	Unfavourable declining	5,500 individuals	Yes
Goldeneye	Non-breeding	Favourable maintained	150 individuals	Yes
Goosander	Non-breeding	Unfavourable declining	110 individuals	Yes

1.7 Loch Leven SPA and Ramsar Site

1.7.1 European Site Information and Conservation Objectives

42. The Loch Leven SPA was classified in 2000 at the same time that the Ramsar site was extended from its original 1976 classification boundary. Loch Leven in central Scotland is the largest natural eutrophic lake in Britain. It is a relatively shallow loch, surrounded by farmland, with a diverse aquatic flora and shoreline vegetation. The boundary of the Loch Leven SPA and Ramsar site follows that of the Loch Leven SSSI and is located approximately 206 km from the Bellrock WFDA.
43. Loch Leven SPA qualifies under Article 4.1 by supporting a population of European importance of wintering whooper swan (1993/94-97/98 winter peak mean of 97 individuals, 2 % of British population). It also qualifies under Article 4.2 by regularly supporting populations of European importance of wintering pink-footed geese (1993/94-97/98 winter peak mean of 17,163 individuals, 8 % of total population, all of which winters in Britain) and shoveler (509 individuals, 1 % of northwestern European and 5 % of British). Loch Leven SPA further qualifies under Article 4.2 by regularly supporting a wintering waterfowl assemblage of European importance (1993/94-1997/98 winter peak mean of 34,280 individuals) which includes large populations of cormorant (391 individuals, 3 % of GB population) gadwall (245 individuals, 3 % of GB population), teal (2,771 individuals, 2 % of GB population), pochard (1,095 individuals, 2 % of GB population), tufted duck (3,636 individuals, 6 % of GB population) and goldeneye (339, 2 % of GB population).
44. The potential for LSE has been identified in relation to all of the qualifying species (**Table 1.7**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
45. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage) are:
 - To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
46. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.

47. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.7: Details on the Qualifying Features of the Loch Leven SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Favourable maintained	34,280 individuals	Yes
Whooper swan	Non-breeding	Favourable maintained	97 individuals	Yes
Pink-footed goose	Non-breeding	Favourable maintained	17,163 individuals	Yes
Shoveler	Non-breeding	Favourable maintained	509 individuals	Yes
Cormorant ¹	Non-breeding	Favourable maintained	391 individuals	Yes
Gadwall ¹	Non-breeding	Favourable maintained	245 individuals	Yes
Teal ¹	Non-breeding	Favourable maintained	2,771 individuals	Yes
Pochard ¹	Non-breeding	Favourable maintained	1,095 individuals	Yes
Tufted duck ¹	Non-breeding	Favourable maintained	3,636 individuals	Yes
Goldeneye ¹	Non-breeding	Favourable maintained	339 individuals	Yes
Notes:				
¹ Named component of the assemblage only.				

1.8 South Tayside Goose Roosts SPA and Ramsar Site

1.8.1 European Site Information and Conservation Objectives

48. The South Tayside Goose Roosts SPA and Ramsar site was classified in 1993. The South Tayside Goose Roosts Ramsar site comprises seven lochs, a number of smaller water bodies and other wetland habitats in Strathearn and Strathallan to the west of Perth in eastern Scotland. The site is overlapped completely by parts of three SSSI: Carsebreck and Rhynd Lochs SSSI, Drummond Lochs SSSI, and Dupplin Lakes SSSI, and is located approximately 214 km from the Bellrock WFDA.
49. South Tayside Goose Roosts SPA qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: wigeon (1988 to 1991, up to 16 pairs, and selected as one of the most suitable sites for wigeon in GB with 5.3 % of the GB population), pink-footed goose (31,800 individuals, 29 % of the Eastern Greenland/Iceland/UK biogeographic

population) and greylag goose (9,700 individuals, 10 % of the Iceland/UK/Ireland biogeographic population). South Tayside Goose Roosts SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1985/86 to 1989/90 the average peak winter count was at least 43,290 individual waterfowl, including nationally important populations of the following species: pink-footed goose (31,800 individuals, 29 % of the GB population) and greylag goose (9,700 individuals, 10 % of the GB population).

50. The potential for LSE has been identified in relation to all of the qualifying species (**Table 1.8**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
51. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and
 - No significant disturbance of the species.
52. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
53. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.8: Details on the Qualifying Features of the South Tayside Goose Roosts SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Waterfowl Assemblage	Non-breeding	Unfavourable no change	43,290 individuals	Yes
Wigeon	Non-breeding	Unfavourable declining	16 pairs	Yes
Pink-footed goose	Non-breeding	Unfavourable declining	31,800 individuals	Yes
Greylag goose	Non-breeding	Unfavourable declining	9,700 individuals	Yes

1.9 River Spey – Insh Marshes SPA and Ramsar Site

1.9.1 European Site Information and Conservation Objectives

54. The River Spey-Insh Marshes SPA and Ramsar site was classified in 1997. The River Spey-Insh Marshes SPA lies to either side of the River Spey upstream of Loch Insh in the central Highlands. The SPA is over 5 km long and over 1 km wide. Partly due to seasonal flooding, there is a very large area of swamp, fen and carr which, together, form the largest single unit of poor fen floodplain mire in the UK. It is also one of the most natural systems of its type left in Britain. The River Spey is considered to be a unique example in Britain of a large, high altitude, but slow flowing river. Loch Insh, is however, noted for its exceptionally rapid water turnover and is an excellent example of a mesotrophic loch, an uncommon type in Britain. The boundaries of the SPA and Ramsar site are coincident with those of the River Spey-Insh Marshes SSSI and partly overlap the River Feshie SSSI. The River Spey-Insh Marshes SPA and Ramsar site is located approximately 228 km from the Bellrock WFDA.
55. The River Spey-Insh Marshes SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: osprey (forage throughout the SPA (2008 to 2012, five year average of up to 10 territories within feeding range, 5 % of the GB population and 1991 to 1995 a five year average of 4 pairs breeding within the site, 4 % of the GB population); spotted crane (1991 to 1995, a 5 year average of 3 calling males, 19 % of the GB population); wood sandpiper (1991 to 1995, a five year average of 2 pairs, 33 % of the GB population). Over the period 1990/91 to 1994/95, average winter peak counts of: whooper swan (190 individuals, 3 % of the GB population) and hen harrier (11 individuals, 1 % of the GB population). The River Spey-Insh Marshes SPA further qualifies under Article 4.2 by regularly supporting a population of European importance of the migratory species: wigeon (2006 to 2010, average of 17 pairs, selected as one of the most suitable sites for wigeon in GB with 5.7 % of the GB population).
56. The potential for LSE has been identified in relation to two of the six qualifying species (**Table 1.9**), with the effect pathways associated with LSE detailed in Table 2.1 of the **Bellrock WFDA RIAA Part 3: Ornithology (Volume VI)**.
57. The conservation objectives of this SPA (as determined from NatureScot (2025b) SiteLink webpage are:
 - To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site;
 - Distribution of the species within site;
 - Distribution and extent of habitats supporting the species;
 - Structure, function and supporting processes of habitats supporting the species; and

- No significant disturbance of the species.

58. The Bellrock WFDA does not overlap with the SPA, so potential impacts on its qualifying features will only occur as a result of individuals from the colony occurring in the area (or vicinity) of the Bellrock Wind Farm Infrastructure.
59. Consequently, the focus of the assessment for this SPA population is concerned with the conservation objective to maintain the populations of each qualifying feature as a viable component because the other conservation objectives either apply to the site itself, and not to areas beyond the boundary, or are encompassed by the assessment of this conservation objective.

Table 1.9: Details on the Qualifying Features of the River Spey-Insh Marshes SPA and Ramsar Site

Qualifying Feature	Season	Site Condition	Citation Population Size	Potential LSE
Osprey	Breeding	Favourable maintained	10 territories	Yes
Hen harrier	Non-breeding	Favourable maintained	11 individuals	No
Spotted crane	Breeding	Favourable maintained	3 calling males	No
Wood sandpiper	Breeding	Unfavourable declining	2 pairs	No
Whooper swan	Non-breeding	Favourable maintained	190 individuals	Yes
Wigeon	Breeding	Unfavourable, no change	17 pairs	No

This page is intentionally blank

Appendix B: In-combination Assessment Update

This page is intentionally blank

Bellrock Offshore Wind Farm

Wind Farm Development Area

Report To Inform Appropriate Assessment - Volume VI

Part 3: Special Protection Area and Ramsar Assessments: Ornithology

Appendix B: In-combination Assessment Update

Date: April 2026

Document Number: RHDV_BEL_CST_REP_0016

Revision Number: 1

Classification: Public

Revision History

Rev.	Prepared By	Checked By	Approved By	Date
1	Haskoning	SA	BMcG	01/04/2026

This page is intentionally blank

Contents

1	Introduction	1
2	Methodology.....	3
3	Results of In-combination Assessment Update	7
4	Conclusions	17
5	References.....	29

List of Tables

Table 3.1:	In-combination Assessment Update Estimates for Kittiwake.....	9
Table 3.2:	In-combination Assessment Update Estimates for Razorbill	11
Table 3.3:	In-combination Assessment Update Estimates for Puffin.....	13
Table 3.4:	In-combination Assessment Update Estimates for Gannet	14
Table 3.5:	Summary of In-combination Assessment Update Conclusions	19

Glossary of Terminology

Term	Definition
Applicant	Bellrock Offshore Wind Farm Limited, the legal entity submitting Section 36 Consent and Marine Licence applications for the Bellrock Offshore Wind Farm Development Area.
Wind Farm Development Area	The boundary within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Infrastructure	Infrastructure located within the Wind Farm Development Area including wind turbine generators; floating substructures, station keeping systems and associated scour protection; inter-array cables and associated cable protection; subsea cable hubs; and ancillary infrastructure including buoys (including activities associated with the Wind Farm Infrastructure construction, operation and maintenance, and decommissioning).

Glossary of Abbreviations

Term	Definition
AA	Appropriate Assessment
AEoSI	Adverse Effect on Site Integrity
CEF	Cumulative Effects Framework
EIA	Environmental Impact Assessment
HRA	Habitats Regulations Appraisal
NEEOG	North East and East Ornithology Group
OWF	Offshore windfarm
PVA	Population viability analysis
RIAA	Report to Inform Appropriate Assessment
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
WFDA	Wind Farm Development Area

This page is intentionally blank

1 Introduction

1. This offshore ornithology In-combination Assessment Update is an Appendix to the **Bellrock Wind Farm Development Area (WFDA) Report to Inform Appropriate Assessment (RIAA) Part 3: Special Protection Area (SPA) and Ramsar Assessments: Ornithology (Volume VI)**.
2. An end of March 2025 cut-off for the consideration of other projects was agreed with NatureScot in February 2025 (refer to Table 1.1 in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** for further information), based on information available from the most recent update (April 2025) of the North East and East Ornithology Group (NEEOG) led cumulative effects work package (subsequently referred to as the NEEOG Interim Cumulative Effects Framework (CEF)). The NEEOG Interim CEF included the details and data from other offshore wind farms (OWFs) as available up to the end of March 2025. The cumulative assessment, set out in the **Bellrock WFDA EIA Report Chapter 10: Offshore Ornithology (Volume II)**, and the in-combination assessment within the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** were based on the OWF projects included in the NEEOG Interim CEF.
3. This report provides an update to the in-combination assessment conclusions presented in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**. This update has been undertaken in light of changes between the end of March 2025 cut-off for projects included in the quantitative assessment of collision risk and/or displacement effects and the end of February 2026 (the cut-off applied to this update), when considering the Bellrock Wind Farm Infrastructure in-combination with other OWF projects.
4. The update considers the four species which are qualifying features (or named components of the breeding seabird assemblage feature) of the breeding seabird colony SPAs which have connectivity with the Bellrock WFDA and for which in-combination assessments have been undertaken within the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, specifically kittiwake, razorbill, puffin, and gannet.
5. Several changes to other OWF projects have occurred between the end of March 2025 and the end of February 2026 that could affect the in-combination mortality estimates, which, in turn, could affect the assessment conclusions presented in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**. These are:
 - Four OWF projects (specifically Aspen, Ayre, Buchan and MarramWind) have submitted consent applications and have the potential to contribute to in-combination mortality for some of the SPA populations assessed in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**;
 - Three OWF projects have received consent from the Scottish Government (specifically Berwick Bank, Salamander and West of Orkney). These OWF projects are required to provide compensation for SPA populations where the Scottish Ministers, in the respective Appropriate Assessments (AAs), concluded an adverse effect on site integrity (AEoSI) or were unable to conclude no AEoSI on a European Site. The potential mortality predicted on those populations

can therefore be excluded from the in-combination totals considered within the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, on the basis that there would be no net mortality effect once compensation is taken into account. It should be noted that NatureScot had already provided advice to Bellrock Offshore Wind Farm Limited (the Applicant) on addressing the predicted mortality from the Berwick Bank Wind Farm within the in-combination assessment which enables the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** conclusions to account for the provision of compensation for those SPA populations for which an AEoSI was concluded or could not be ruled out in the Scottish Ministers' AA (see Table 1.1 of the **Bellrock WFDA RIAA: Part 3 SPA and Ramsar Assessments: Ornithology (Volume VI)**); and

- Three OWF projects submitted before the end of March 2025 (and therefore included within the Bellrock WFDA in-combination assessment) but which remain to be determined, have submitted additional information (specifically Muir Mhòr, Caledonia and Ossian). Where this additional information updates the potential mortality predicted for these projects, this could affect the in-combination totals used in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**.

6. This update therefore considers the effects of the above changes on the predicted in-combination mortalities that have been used (and presented) in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, presenting an estimate of the extent of change in these values together with a qualitative evaluation of the implications for the assessment conclusions as presented in the Bellrock WFDA RIAA (i.e. whether or not AEoSI would occur or could not be ruled out). In addition, since April 2025, two of the OWF projects in English waters that are included within the NEEOG Interim CEF have received consents (i.e. Five Estuaries and Outer Dowsing). However, the Planning Inspectorate examinations for these projects were either completed or near completed by April 2025, and it is unlikely that the consents would be associated with any substantive changes in the numbers used to derive the predicted mortalities for these projects. As such, these projects have not been included in this update.
7. Reference should be made to the relevant sections of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** and supporting appendices of **Chapter 10: Offshore Ornithology (Volume II)** of the **Bellrock WFDA EIA Report**, particularly **Appendix 10.4: Offshore Ornithology Population Viability Technical Report (Volume IV)**, to inform the background to the assessment considered in this update.

2 Methodology

8. The update has considered changes in the predicted adult mortality for those populations which are qualifying features (or named components of the assemblage feature) from breeding seabird colony SPAs and which were taken forward to the Phase Two of the Habitats Regulations Appraisal (HRA) process in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**. These are:
- Kittiwake:
 - Fowlsheugh SPA;
 - Buchan Ness to Collieston Coast SPA;
 - Flamborough & Filey Coast SPA;
 - Troup, Pennan & Lion's Heads SPA;
 - East Caithness Cliffs SPA;
 - St Abb's Head to Fast Castle SPA;
 - Farne Islands SPA;
 - Forth Islands SPA;
 - North Caithness Cliffs SPA;
 - Copinsay SPA;
 - Fair Isle SPA;
 - Hoy SPA; and
 - West Westray SPA.
 - Razorbill:
 - Fowlsheugh SPA;
 - Forth Islands SPA;
 - Troup, Pennan & Lion's Heads SPA;
 - East Caithness Cliffs SPA;
 - North Caithness Cliffs SPA;
 - Flamborough & Filey Coast SPA;
 - Mingulay & Berneray SPA; and
 - Rathlin Island SPA.
 - Puffin:
 - Farne Islands SPA;
 - Forth Islands SPA;

- North Caithness Cliffs SPA;
 - Coquet Island SPA.
 - Gannet:
 - Fair Isle SPA:
 - Forth Islands SPA:
 - Hermaness, Saxa Vord & Valla Field SPA:
 - North Rona & Sula Sgeir SPA:
 - Noss SPA:
 - St Kilda SPA:
 - Sule Skerry & Sule Stack SPA: and
 - Flamborough & Filey Coast SPA.
9. For each of these SPA populations, the annual mortality of breeding adult birds predicted to result from the Bellrock WFDA in-combination with other plans and projects, was extracted from the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, with the upper mortality value used in each case¹. For kittiwake and gannet, this represented the combined mortality predicted to occur from collisions and displacement (inclusive of barrier effects) during the operation and maintenance phase, whilst for razorbill and puffin it represented the mortality from displacement (inclusive of barrier effects) during the operation and maintenance phase (noting that collision mortality is not screened in as an effect pathway for the latter two species). These mortality values have been used as the 'baseline' for the re-estimation of the predicted in-combination mortality.
10. Additionally, in accordance with the approach taken in the conclusions of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, the baseline in-combination estimates have excluded the predicted mortality from the Berwick Bank project for those SPA populations for which the Scottish Ministers were unable to exclude an AEoSI in their AA (and compensation will therefore be provided), but included this mortality where an AEoSI from Berwick Bank was ruled out. The re-estimation has been undertaken as follows:
- For the projects submitted to the Scottish Government between the end of March 2025 and the end of February 2026, predicted annual adult mortality apportioned to each of the above SPA populations has been derived from the respective submission documents. These values were then added to the baseline in-combination estimates:

¹ Upper and lower annual mortality values are presented for each of these SPA populations in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, as derived from the species-specific upper and lower displacement mortality rates that are used and which follow NatureScot (2023) guidance. The conclusions in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** are based upon the upper values.

- **Aspen:** Aspen Offshore Wind Farm Habitats Regulations Appraisal Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01, August 2025 (GoBe, 2025);
- **Ayre:** Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites, November 2025 (Thistle Wind Partners, 2025);
- **Buchan:** Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment, July 2025 (Natural Power Consultants, 2025a); and
- **MarramWind:** Report to Inform Appropriate Assessment MarramWind Offshore Wind Farm, December 2025 (WSP, 2025).
- For the Salamander and West of Orkney projects (consented since the end of March 2025), the respective Scottish Ministers' AA has been reviewed. As detailed above, where an AEoSI has been concluded (or could not be excluded) by the Scottish Ministers for a particular SPA population, there is a requirement to provide compensation. Therefore, in these cases, the predicted mortality value from the Scottish Ministers' AA has been subtracted from the baseline in-combination value, with these values derived from:
 - **Salamander:** Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas Of Conservation and Special Protection Areas In View of the Sites' Conservation Objectives – Salamander Offshore Windfarm, December 2024 (Scottish Government, 2024); and
 - **West of Orkney:** Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas Of Conservation and Special Protection Areas In View of the Sites' Conservation Objectives – West of Orkney Offshore Windfarm, March 2025 (Scottish Government, 2025).
- For submitted projects for which additional information, including updated mortality estimates, has been submitted between the end of March 2025 and the end of February 2026, the predicted annual mortality values from the original submission have been subtracted from the baseline, and replaced by the updated values as presented in the additional information, with these values derived from:
 - **Muir Mhòr:**
 - Muir Mhor submission Appendix 11.5 Annex G Impacts to breeding adults.xls, November 2024 (Natural Power Consultants, 2025b); and
 - Update values from ossian_ornithology_incombination_pva_screening_tool_v4.xls (Ossian Offshore Wind Farm Limited, 2026).
 - **Caledonia:**
 - Caledonia North/South Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment October 2024 (Caledonia Offshore Wind Farm Limited, 2025); and
 - Update values from ossian_ornithology_incombination_pva_screening_tool_v4.xls (Ossian Offshore Wind Farm Limited, 2026).

- **Ossian:**
 - Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA), June 2024 (NIRAS/RPS, 2024); and
 - Update values from `ossian_ornithology_incombination_pva_screening_tool_v4.xls` (Ossian Offshore Wind Farm Limited, 2026).
 - Based upon the above adjustments, an updated value for the predicted annual adult mortality from the Bellrock WFDA in-combination with other plans and projects is calculated, along with the net change in this value relative to the baseline in-combination value (as presented and used in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).
11. In producing the revised in-combination estimates, the upper values of annual adult mortality have been used in all cases¹, as have the values as derived from the 'guidance'/'Statutory Nature Conservation Body (SNCB)'/NatureScot' (as opposed to 'Applicant') approach, where applicable. For puffin, the in-combination mortality estimates are derived for the breeding season only, in accordance with the NatureScot advice to the Applicant that, given the evidence available, the non-breeding season impacts on puffin are not required quantitatively within the HRA, and that they can be addressed qualitatively (refer to Table 1.1 in **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).
12. In addition to presenting the net change between the updated and baseline values for the predicted in-combination mortality, the difference in the percentage point change in adult mortality for the baseline and updated estimates has also been calculated for each SPA population. The implications of these changes for the conclusions of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)** in respect of AEoSI are considered qualitatively.

3 Results of In-combination Assessment Update

13. The results of the in-combination assessment update in respect of kittiwake, razorbill, puffin and gannet are presented in **Table 3.1**, **Table 3.2**, **Table 3.3** and **Table 3.4** respectively.

This page is intentionally blank

Table 3.1: In-combination Assessment Update Estimates for Kittiwake

SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoS <i>i</i> Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value 'Baseline' (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹¹	West of Orkney ¹²	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ²	Original ⁸	Updated ^{2, 10}	Original ⁹	Updated ²						
Buchan Ness to Collieston Coast SPA ¹	27,094	115.83	132.93	115.83	1.31	0.68	1.16	0.00	19.70	1.38	13.91	11.50	2.77	2.80	6.60	6.50	95.42	-20.41	-17.62%	0.4275	0.3522	-0.0753
Fowlsheugh SPA ¹	28,078	149.11	252.72	149.11	1.14	0.50	2.17	0.00	4.10	1.06	4.95	7.10	2.04	2.10	9.80	9.40	149.57	0.46	0.31%	0.5311	0.5327	0.0016
St Abb's Head to Fast Castle SPA	11,992	41.64	335.45	41.64	0.19	0.10	0.09	0.52	0.40	0.00	0.62	0.80	0.25	0.30	2.70	2.70	42.37	0.73	1.75%	0.3472	0.3533	0.0061
Farne Islands SPA	5,790	25.85	53.81	53.81	0.09	0.10	0.07	0.39	0.00	0.00	0.61	0.60	0.09	0.10	2.20	2.10	54.36	0.55	1.03%	0.9294	0.9389	0.0096
Forth Islands SPA	13,114	51.53	85.88	51.53	0.24	0.13	0.28	0.57	0.40	0.33	1.81	1.10	0.36	0.40	2.00	1.90	51.26	-0.27	-0.53%	0.3929	0.3909	-0.0021
Troup, Pennan & Lion's Heads SPA ¹	21,232	114.13	129.22	114.13	0.41	0.91	2.06	0.00	6.50	0.00	9.35	6.00	7.77	7.90	3.30	3.50	107.99	-6.14	-5.38%	0.5375	0.5086	-0.0289
East Caithness Cliffs SPA ¹	36,600	387.35	421.45	387.35	0.82	3.21	1.90	0.00	3.10	6.70	7.22	4.30	19.05	18.00	4.20	4.30	379.61	-7.74	-2.00%	1.0583	1.0372	-0.0212
North Caithness Cliffs SPA	18,058	67.37	75.80	67.37	0.50	1.05	3.48	0.94	0.50	5.45	0.82	0.90	2.28	2.50	0.40	0.80	68.08	0.71	1.06%	0.3731	0.3770	0.0040
Copinsay SPA	1,910	3.47	4.02	4.02	0.01	0.81	0.02	0.16	0.00	0.00	0.05	0.00	0.09	0.10	0.10	0.10	4.99	0.97	24.00%	0.2105	0.2610	0.0505
Flamborough & Filey Coast SPA	89,148	581.99	613.77	581.99	0.32	1.13	0.00	1.15	0.00	0.00	0.00	0.00	0.00	0.00	6.70	6.70	584.59	2.60	0.45%	0.6528	0.6558	0.0029
Hoy SPA	532	2.25	2.58	2.58	0.01	0.05	0.01	0.04	0.00	0.30	0.04	0.00	0.08	0.08	0.00	0.00	2.35	-0.23	-8.76%	0.4847	0.4422	-0.0425
Fair Isle SPA	896	3.73	4.37	4.37	0.01	0.06	0.02	0.07	0.00	0.00	0.06	0.10	0.04	0.00	0.00	0.10	4.64	0.26	6.06%	0.4882	0.5178	0.0296
West Westray SPA	5,510	58.01	68.03	58.01	0.16	0.72	0.20	0.00	0.00	1.62	0.50	0.50	0.51	0.70	0.00	0.00	57.66	-0.35	-0.61%	1.0529	1.0465	-0.0064

Notes:

Green indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Berwick Bank project.



SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoS ¹ Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value ‘Baseline’ (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹¹	West of Orkney ¹²	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ²	Original ⁸	Updated ^{2, 10}	Original ⁹	Updated ²						

Grey indicates where the SPA population was not assessed.

Blue indicates the Scottish Ministers’ AA concluded an AEoS¹ or where an AEoS¹ could not be ruled out for the Salamander or West of Orkney projects, so consent is dependent on the provision of compensation.

All values are for the combined predicted displacement and collision mortality.

¹ In-combination totals exclude the predicted mortality due to the Green Volt wind farm, in accordance with NatureScot advice (see Table 1.1 of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).

² From ossian_ornithology_incombination_pva_screening_tool_v4 (Ossian Offshore Wind Farm Limited, 2026)

³ From Aspen Offshore Wind Farm Habitats Regulations Appraisal Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01 August 2025 ('NS High' values) (GoBe, 2025).

⁴ From Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites November 2025 (upper adult mortality values) (Thistle Wind Partners, 2025).

⁵ From Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment July 2025 (upper adult mortality values) (Natural Power Consultants, 2025a).

⁶ From Report to Inform Appropriate Assessment MarramWind Offshore Wind Farm December 2025 (upper adult mortality values, guidance approach) (WSP, 2025).

⁷ From Muir Mhòr submission Appendix 11.5 Annex G Impacts to breeding adults.xls (Natural Power Consultants, 2025b).

⁸ From Caledonia North/South Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment October 2024 (upper values, guidance approach) (Caledonia Offshore Wind Farm Limited, 2025).

⁹ From Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA) June 2024 (SNCB/higher values) (NIRAS/RPS, 2024).

¹⁰ From Volume 8 Additional Information Appendix 4: Ornithology Additional Information Report (Caledonia OWF) (upper values, guidance approach) (Caledonia Offshore Wind Farm Limited, 2025).

¹¹ From Scottish Ministers’ Assessment of the Project’s Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites’ Conservation Objectives – Salamander Offshore Windfarm, December 2024 (Scottish Government, 2024).

¹² From Scottish Ministers’ Assessment of the Project’s Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites’ Conservation Objectives – West of Orkney Offshore Windfarm, March 2025 (Scottish Government, 2025).

Table 3.2: In-combination Assessment Update Estimates for Razorbill

SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoSI Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value 'Baseline' (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹²	West of Orkney ¹³	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ²	Original ⁸	Updated ^{2, 10}	Original ⁹	Updated ^{2, 11}						
Fowlsheugh SPA	18,844	138.21	161.12	138.21	0.01	0.19	0.00	0.21	2.50	0.00	0.91	10.40	0.41	0.00	28.40	4.47	121.27	-16.94	-12.26%	0.7334	0.6436	-0.0899
Forth Islands SPA	8,379	79.96	98.91	79.96	0.01	0.14	0.00	0.16	0.00	0.00	0.00	0.00	0.31	0.00	0.00	1.80	81.76	1.80	2.25%	0.9543	0.9758	0.0215
Troup, Pennan & Lion's Heads SPA	6,054	24.58	27.76	24.58	0.64	0.55	0.92	0.00	1.60	0.00	0.96	4.40	3.34	3.00	0.00	0.85	29.04	4.46	18.16%	0.4060	0.4797	0.0737
East Caithness Cliffs SPA ¹	40,373	274.20	288.97	274.20	0.04	8.84	9.64	0.75	0.60	0.84	0.00	0.00	20.66	21.75	0.00	0.00	293.12	18.92	6.90%	0.6792	0.7260	0.0469
North Caithness Cliffs SPA	4,796	21.79	23.51	23.51	0.01	1.38	2.82	0.10	0.00	0.00	0.00	0.00	3.14	2.46	0.00	0.00	27.13	3.63	15.43%	0.4901	0.5658	0.0756
Flamborough & Filey Coast SPA	61,345	357.74	368.36	357.74	0.03	0.54	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	358.91	1.17	0.33%	0.5832	0.5851	0.0019
Mingulay & Berneray SPA	26,787	8.28	8.71	8.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.71	0.00	0.00%	0.0325	0.0325	0.0000
Rathlin Island SPA	29,803	7.43	7.91	7.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.91	0.00	0.00%	0.0265	0.0265	0.0000

Notes:

Green indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Berwick Bank project.

Grey indicates where the SPA population was not assessed.

Blue indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Salamander or West of Orkney projects, so consent is dependent on the provision of compensation.

¹ In-combination totals exclude the predicted mortality due to the Green Volt wind farm, in accordance with NatureScot advice (see Table 1.1 of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).

² From ossian_ornithology_incombination_pva_screening_tool_v4 (Ossian Offshore Wind Farm Limited, 2026).

³ From Aspen Offshore Wind Farm Habitats Regulations Appraisal Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01 August 2025 ('NS High' values) (GoBe, 2025).

⁴ From Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites November 2025 (upper adult mortality values) (Thistle Wind Partners, 2025).

⁵ From Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment July 2025 (upper adult mortality values) (Natural Power Consultants, 2025a).

⁶ From Report to Inform Appropriate Assessment MarramWind Offshore Wind Farm December 2025 (upper adult mortality values, guidance approach) (WSP, 2025).

⁷ From Muir Mhòr submission Appendix 11.5 Annex G Impacts to breeding adults.xls (Natural Power Consultants, 2025b).

⁸ From Caledonia North/South Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment October 2024 (upper values, guidance approach) (Caledonia Offshore Wind Farm Limited, 2025).

⁹ From Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA) June 2024 (SNCB/higher values) (NIRAS/RPS, 2024).

¹⁰ From Volume 8 Additional Information Appendix 4: Ornithology Additional Information Report (Caledonia OWF) (upper values, guidance approach) (Caledonia Offshore Wind Farm Limited, 2025).

¹¹ From Ossian Array Report to Inform Appropriate Assessment Additional Environmental Information October 2025 (upper values, NatureScot approach) (NIRAS/RPS, 2025).

¹² From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – Salamander Offshore Windfarm, December 2024 (Scottish Government, 2024).

¹³ From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – West of Orkney Offshore Windfarm, March 2025 (Scottish Government, 2025).

Table 3.3: In-combination Assessment Update Estimates for Puffin

SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoSI Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value 'Baseline' (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹¹	West of Orkney ¹²	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ^{2, 10}	Original ⁸	Updated ²	Original ⁹	Updated ²						
Farne Islands SPA	100,206	47.86	69.26	69.26	1.78	0.00	0.00	0.00	0.00	0.00	4.20	10.57	0.00	0.00	12.10	12.10	77.41	8.15	11.77%	0.0691	0.0773	0.0081
Forth Islands SPA ¹	117,960	264.10	294.30	264.10	3.12	0.00	3.32	0.00	3.80	0.00	10.20	10.97	0.00	12.58	11.50	11.50	280.09	15.99	6.05%	0.2239	0.2374	0.0136
Coquet Island SPA	50,058	19.90	25.90	25.90	0.00	0.00	0.00	0.00	0.00	0.00	1.80	4.02	0.00	0.00	5.00	5.00	28.12	2.22	8.56%	0.0517	0.0562	0.0044
North Caithness Cliffs SPA	6,078	54.11	54.21	54.21	0.05	0.74	0.57	0.56	0.00	0.00	0.39	0.43	1.63	1.42	0.00	0.00	55.96	1.75	3.23%	0.8918	0.9207	0.0288

Notes:

Green indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Berwick Bank project.

Grey indicates where the SPA population was not assessed.

Blue indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Salamander or West of Orkney projects, so consent is dependent on the provision of compensation.

¹ In-combination totals exclude the predicted mortality due to the Green Volt wind farm, in accordance with NatureScot advice (see Table 1.1 of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).

² From ossian_ornithology_incombination_pva_screening_tool_v4 (Ossian Offshore Wind Farm Limited, 2026).

³ From Aspen Offshore Wind Farm Habitats Regulations Appraisal Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01 August 2025 ('NS High' values, breeding season only) (GoBe, 2025).

⁴ From Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites November 2025 (upper adult mortality values, breeding season only) (Thistle Wind Partners, 2025).

⁵ From Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment July 2025 (upper adult mortality values, breeding season only) (Natural Power Consultants, 2025a).

⁶ From Report to Inform Appropriate Assessment MarramWind Offshore Wind Farm December 2025 (upper adult mortality values, guidance approach, breeding season only) (WSP, 2025).

⁷ From Muir Mhòr submission Appendix 11.5 Annex G Impacts to breeding adults.xls (Natural Power Consultants, 2025b).

⁸ From Caledonia North/South Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment October 2024 (upper values, guidance approach, breeding season only) (Caledonia Offshore Wind Farm Limited, 2025).

⁹ From Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA) June 2024 (SNCB/higher values, breeding season only) (NIRAS/RPS, 2024).

¹⁰ From Muir Mhòr Additional Information Report Chapter 3: Offshore and Intertidal Ornithology RIAA Rev 1 September 2025 (HiDef, 2025).

¹¹ From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – Salamander Offshore Windfarm, December 2024 (Scottish Government, 2024).

¹² From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – West of Orkney Offshore Windfarm, March 2025 (Scottish Government, 2025).

Table 3.4: In-combination Assessment Update Estimates for Gannet

SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoSI Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value 'Baseline' (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹⁰	West of Orkney ¹¹	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ²	Original ⁸	Updated ²	Original ⁹	Updated ²						
Forth Islands SPA ¹	103,688	768.71	974.76	768.71	10.98	2.15	3.32	20.73	3.80	10.40	10.60	12.20	8.12	7.90	58.00	58.00	793.07	24.36	3.17%	0.7414	0.7649	0.0235
Flamborough & Filey Coast SPA	31,588	399.27	402.66	402.66	1.18	0.19	0.40	0.47	0.00	0.00	1.19	1.40	0.35	0.40	4.40	4.40	405.16	2.50	0.62%	1.2747	1.2826	0.0079
Fair Isle SPA	11,184	13.16	14.09	14.09	0.60	1.12	0.60	1.83	0.00	0.61	0.46	0.50	0.68	0.70	1.00	1.00	17.68	3.59	25.49%	0.1260	0.1581	0.0321
Sule Skerry & Sule Stack SPA	15,648	34.63	35.41	35.41	0.33	0.73	0.38	1.33	0.00	0.00	0.34	0.40	1.21	0.90	0.90	0.90	37.93	2.52	7.11%	0.2263	0.2424	0.0161
Noss SPA	24,670	38.46	40.54	40.54	1.00	0.95	0.76	2.92	0.00	0.00	0.93	1.10	0.90	0.90	2.10	2.10	46.34	5.80	14.30%	0.1643	0.1878	0.0235
North Rona & Sula Sgeir SPA	18,990	6.82	7.34	7.34	0.24	0.36	0.19	0.99	0.00	0.00	0.25	0.30	0.73	0.40	0.80	0.80	8.84	1.51	20.52%	0.0386	0.0466	0.0079
Hermaness, Saxa Vord & Valla Field SPA	39,606	78.89	82.99	78.89	1.61	1.18	0.90	3.68	0.00	3.78	1.93	2.20	1.15	1.20	3.80	3.80	82.81	3.92	4.97%	0.1992	0.2091	0.0099
St Kilda SPA	118,410	4.47	4.47	4.47	0.89	0.60	0.61	0.00	0.00	0.00	0.96	1.10	0.00	0.00	2.60	2.60	6.71	2.24	50.02%	0.0038	0.0057	0.0019

Notes:

Green indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Berwick Bank project.**Grey** indicates where the SPA population was not assessed.**Blue** indicates the Scottish Ministers' AA concluded an AEoSI or where an AEoSI could not be ruled out for the Salamander or West of Orkney projects, so consent is dependent on the provision of compensation.

All values are for the combined predicted displacement and collision mortality.

¹ In-combination totals exclude the predicted mortality due to the Green Volt wind farm, in accordance with NatureScot advice (see Table 1.1 of the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**).² From ossian_ornithology_incombination_pva_screening_tool_v4 (Ossian Offshore Wind Farm Limited, 2026).³ From Aspen Offshore Wind Farm Habitats Regulations Appraisal Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01 August 2025 ('NS High' values) (GoBe, 2025).⁴ From Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites November 2025 (upper adult mortality values) (Thistle Wind Partners, 2025).⁵ From Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment July 2025 (upper adult mortality values) (Natural Power Consultants, 2025a).⁶ From Report to Inform Appropriate Assessment MarramWind Offshore Wind Farm December 2025 (upper adult mortality values, guidance approach) (WSP, 2025).⁷ From Muir Mhòr submission Appendix 11.5 Annex G Impacts to breeding adults.xls (Natural Power Consultants, 2025b).⁸ From Caledonia North/South Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment October 2024 (upper values, guidance approach) (Caledonia Offshore Wind Farm Limited, 2025).



SPA	Number of Breeding Adults	In-combination Mortality Estimate (RIAA) (Adult Birds, Upper Estimate)			Additional Projects Submitted Between the End of March 2025 Cut-off and End of February 2026				Projects Where AEoSI Has Been Concluded and Consent is Dependent on Compensation		Projects With Updated Mortality Estimates Between the End of March 2025 Cut-off and End of February 2026						Updated In-combination Mortality Estimate (Adult Birds, Upper Estimate)	Net Change in Mortality Estimate		% Point Change in Adult Mortality		
		Excluding Berwick Bank	All Projects	Assessed Value 'Baseline' (RIAA)	Aspen ³	Ayre ⁴	Buchan ⁵	MarramWind ⁶	Salamander ¹⁰	West of Orkney ¹¹	Muir Mhòr		Caledonia		Ossian			Adult Mortality	% Change	RIAA	Update	Difference
											Original ⁷	Updated ²	Original ⁸	Updated ²	Original ⁹	Updated ²						
⁹ From Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA) June 2024 (SNCB/higher values) (NIRAS/RPS, 2024).																						
⁹ From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – Salamander Offshore Windfarm, December 2024 (Scottish Government, 2024).																						
¹⁰ From Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas in View of the Sites' Conservation Objectives – West of Orkney Offshore Windfarm, March 2025 (Scottish Government, 2025).																						

This page is intentionally blank

4 Conclusions

14. **Table 4.1** presents the conclusions to the in-combination update for each SPA population, based on the assessment conclusions in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**.
15. For each SPA population assessed, **no change to the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) conclusions are considered likely.**
16. For a number of the populations, a reduction, or very small increase, in predicted mortality is identified. For other populations, including some where the RIAA concluded no potential for an AEoSI, a more substantial net increase in mortality is predicted, although in all such cases the quantum of change is nonetheless considered unlikely to affect the assessment conclusions presented within the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**. This takes into account the reasons for the conclusions of no AEoSI on the SPA population in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**, which include:
 - For a number of SPA populations, the very small contribution of the Bellrock WFDA to the in-combination mortality (i.e. a fraction of a single bird), which when considered in conjunction with other factors (notably the current population size but also population trends and condition status in some cases) is concluded to be below a level that would make any meaningful contribution to in-combination effects;
 - Small predicted population level impacts (as derived from Population viability analysis (PVA)), which indicate that the in-combination mortality (as determined in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**) is unlikely to affect the achievement of conservation objectives for the SPA population, and that the scale of predicted increase in the in-combination mortality (as determined from this update) would not affect this conclusion; and
 - The trends for some of the SPA populations, where long-term increases have been recorded, and the populations are at or above citation level, such that it is unlikely that the predicted increase in the in-combination mortality (as determined from this update) would prevent further population increase, or prevent the conservation objectives from being met.
17. For some SPA features where an AEoSI could not be ruled out, a reduction in predicted in-combination mortality has been identified when compared to the in-combination mortality used in the **Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI)**. However, it has been concluded in all such cases that this reduction would not affect the assessment outcomes, i.e. this would not reduce the predicted impact to the extent that the potential for an AEoSI could now be ruled out.
18. Further information and the updated conclusions are presented in **Table 4.1**.

This page is intentionally blank

Table 4.1: Summary of In-combination Assessment Update Conclusions

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Buchan Ness to Collieston Coast SPA	Kittiwake	Yes	There is a net reduction (17.62% and 0.0753 in the percentage point change in adult mortality) in predicted mortality. Potentially this could reduce mortality to a level where no AEoSI would be concluded. However, as an AEoSI could not be excluded for a number of recent projects preceding the Bellrock WFDA application, no change to the assessment conclusion is considered warranted.	No change	AEoSI
Fowlsheugh SPA	Kittiwake	Yes	There is a very small net increase (0.31% and 0.0016 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive impact on population level effects, and no change to the assessment conclusion is considered warranted, noting that an AEoSI has been concluded for this feature.	No change	AEoSI
	Razorbill	Yes	There is a net reduction (12.26% and 0.0899 in the percentage point change in adult mortality) in predicted mortality. Potentially this could reduce mortality to a level where no AEoSI would be concluded. However, as an AEoSI could not be excluded for a number of recent projects preceding the Bellrock WFDA application, no change to the assessment conclusion is considered warranted.	No change	AEoSI
St Abb's Head to Fast Castle SPA	Kittiwake	No	There is a small net increase (1.75% and 0.0061 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on the predicted population level impacts and is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period is predicted to be small. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Farne Islands SPA	Kittiwake	Yes	There is a small net increase (1.03% and 0.0096 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on the predicted population level impacts, and no change to the assessment conclusion is considered warranted, noting that an AEoSI has been concluded for this feature.	No change	AEoSI
	Puffin	No	There is a modest increase (11.77% and 0.0081 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on the predicted population level impacts, and it is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period is predicted to be small. This conclusion is also in the context of a population for which the overall population trend since the late 1980s has been increasing and which is currently substantially above the citation level. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
Forth Islands SPA	Kittiwake	No	There is a net reduction (0.53% and 0.0021 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts, and no change to the assessment conclusion is considered warranted.	No change	No AEoSI
	Razorbill	No	There is a small net increase (2.25% and 0.0215 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
	Puffin	No	There is a modest increase (6.05% and 0.0136 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, and it is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period is predicted to be small. This conclusion is also in the context of a population for which the overall population trend since the mid-1980s has been increasing and which is currently substantially above the citation level. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
	Gannet	Yes	There is a modest net increase (3.17% and 0.0235 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts, noting that an AEoSI has been concluded for this feature. No change to the assessment conclusion is considered warranted.	No change	AEoSI
Troup, Pennan and Lion's Heads SPA	Kittiwake	Yes	There is a net reduction (5.38% and 0.0289 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that an AEoSI has been concluded for this feature. No change to the assessment conclusion is considered warranted.	No change	AEoSI
	Razorbill	No	There is a relatively marked increase (18.16% and 0.0737 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period. However, importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. Therefore, no change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Coquet Island SPA	Puffin	No	There is a modest increase (8.56% and 0.0044 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, and it is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period is predicted to be small. This conclusion is also in the context of a population for which the overall population trend since the late 1980s has been increasing and which is currently substantially above the citation level. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
East Caithness Cliffs SPA	Kittiwake	Yes	There is a net reduction (2.00% and 0.0212 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, and no change to the assessment conclusion is considered warranted, noting that an AEoSI has been concluded for this feature.	No change	AEoSI
	Razorbill	No	There is a modest net increase (6.90% and 0.0469 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
North Caithness Cliffs SPA	Kittiwake	No	There is a small net increase (1.06% and 0.0040 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
	Razorbill	No	There is a relatively marked increase (15.43% and 0.0756 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period. However, importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. Therefore, no change to the assessment conclusion is considered warranted.	No change	No AEoSI
	Puffin	No	There is a small net increase (3.23% and 0.0288 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
Copinsay SPA	Kittiwake	No	There is a relatively large increase (24.00%, and 0.0505 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period, but noting that this reduction was predicted to be small. Importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. Therefore, no change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Flamborough and Filey Coast SPA	Kittiwake	Yes	There is a very small net increase (0.45% and 0.0029 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts, and no change to the assessment conclusion is considered warranted, noting that an AEoSI has been concluded for this feature.	No change	AEoSI
	Razorbill	No	There is a very small net increase (0.33% and 0.0019 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts. Importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
	Gannet	No	There is a very small net increase (0.62% and 0.0079 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts, and it is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the predicted in-combination mortality will not prevent further increases in this population (which has shown substantial and sustained increases over the long-term and is currently substantially above the citation level). No change to the assessment conclusion is considered warranted.	No change	No AEoSI
Hoy SPA	Kittiwake	No	There is a net reduction (8.76% and 0.0425 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Fair Isle SPA	Kittiwake	No	There is a modest increase (6.06% and 0.0296 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
	Gannet	No	There is a relatively marked increase (25.49% and 0.0321 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period, but noting that this reduction was predicted to be small. Importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. Therefore, no change to the assessment conclusion is considered warranted.	No change	No AEoSI
West Westray SPA	Kittiwake	No	There is a net reduction (0.61% and 0.0064 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any material effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
Sule Skerry and Sule Stack SPA	Gannet	No	There is a modest increase (7.11% and 0.0161 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, noting that the RIAA concluded that the predicted mortality for the Bellrock Wind Farm Infrastructure alone is too small to make a meaningful contribution to in-combination effects. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
Noss SPA	Gannet	No	There is a relatively marked increase (14.30% and 0.0235 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period. However, this reduction was predicted to be small and any such change is unlikely to affect the overall conclusion of no AEoSI. This is particularly so, given that the population has undergone a long-term increase and is currently substantially above the citation level. No change to the assessment conclusion is considered warranted.	No change	No AEoSI
North Rona and Sula Sgeir SPA	Gannet	No	There is a relatively marked increase (20.52% and 0.0466 in the percentage point change in adult mortality) in predicted mortality. This could potentially affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) in relation to the scale of the predicted reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period, but noting this reduction is predicted to be small. Importantly, the RIAA concluded that the predicted mortality for the Bellrock WFDA alone is too small to make a meaningful contribution to in-combination effects. Therefore, no change to the assessment conclusion is considered warranted.	No change	No AEoSI
Hermaness, Saxa Vord and Valla Field SPA	Gannet	No	There is a modest increase (4.97% and 0.0099 in the percentage point change in adult mortality) in predicted mortality. This is unlikely to have any substantive effect on population level impacts, and it is considered unlikely to affect the conclusion from the PVA in the Bellrock WFDA RIAA Part 3: SPA and Ramsar Assessments: Ornithology (Volume VI) that the reduction in the size of the impacted population relative to that of the unimpacted population at the end of the 35 year operational period is predicted to be small. This conclusion is also in the context of a population which has shown a long-term increase and is currently substantially above the citation level. No change to the assessment conclusion is considered warranted.	No change	No AEoSI

SPA	Species	Bellrock WFDA RIAA In-combination AEoSI Conclusion	Commentary	Change to In-combination AEoSI Conclusion?	Updated In-combination AEoSI Conclusion
St Kilda SPA	Gannet	No	There is a relatively marked increase (50.02% and 0.0019 in the percentage point change in adult mortality) in predicted mortality but this remains at low levels and well below the 0.02 percentage point increase in adult mortality that NatureScot considers requires additional consideration using PVA. Given that the levels of mortality remain this low, no change to the assessment conclusion is considered warranted.	No change	No AEoSI
Mingulay and Berneray SPA	Razorbill	No	No change to the predicted in-combination mortality has been identified, and therefore no change to the assessment conclusion is considered warranted.	No change	No AEoSI
Rathlin Island SPA	Razorbill	No	No change to the predicted in-combination mortality has been identified, and therefore no change to the assessment conclusion is considered warranted.	No change	No AEoSI

This page is intentionally blank

5 References

Caledonia Offshore Wind Farm Limited (2025) Caledonia North/South Application, Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment, October 2024.

GoBe Consultants Limited (2025) Aspen Offshore Wind Farm Habitats Regulations Appraisal - Offshore Report to Inform Appropriate Assessment Chapter 3: Offshore and Intertidal Ornithology Rev 01, August 2025.

HiDef Aerial Surveying Limited (2025) Muir Mhòr Additional Information Report Chapter 3: Offshore and Intertidal Ornithology RIAA Rev 1 September 2025.

Natural Power Consultants Limited (2025a) Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment, July 2025.

Natural Power Consultants Limited (2025b) Muir Mhòr submission Appendix 11.5 Annex G Impacts to breeding adults.xls, November 2024.

NatureScot (2023). *Guidance Note 8: Guidance to support Offshore Wind Applications: Marine Ornithology Advice for assessing the distributional responses, displacement and barrier effects of Marine birds*. Available at: <https://www.nature.scot/doc/guidance-note-8-guidance-support-offshore-wind-applications-marine-ornithology-advice-assessing>.

NIRAS/RPS (2024) Ossian Part 3: Assessment of Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment (RIAA), June 2024.

NIRAS/RPS (2025) Ossian Array: Report to Inform Appropriate Assessment - Additional Environmental Information, October 2025.

Ossian Offshore Wind Farm Limited (2026)
ossian_ornithology_incombination_pva_screening_tool_v4.xls, January 2026.

Scottish Government (2024) Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas Of Conservation and Special Protection Areas In View of the Sites' Conservation Objectives – Salamander Offshore Windfarm, December 2024.

Scottish Government (2025) Scottish Ministers' Assessment of the Project's Implications for Designated Special Areas Of Conservation and Special Protection Areas In View of the Sites' Conservation Objectives – West of Orkney Offshore Windfarm, March 2025.

Thistle Wind Partners (2025) Ayre Offshore Wind Farm Report to Inform Appropriate Assessment Part 3 - Special Protection Areas and Ramsar Sites, November 2025.

WSP Limited (2025) Report to Inform Appropriate Assessment – MarramWind Offshore Wind Farm, December 2025.

This page is intentionally blank

This page is intentionally blank



www.bellrockwind.co.uk