Bellrock Offshore Wind Farm

Wind Farm Development Area

Environmental Impact Assessment Report - Volume IV

Appendix 10.5: Offshore Ornithology Apportioning Technical Report

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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 Wind Farm Development Area.
Bellrock Offshore Wind Farm (or the Bellrock Project)	An offshore wind farm capable of exporting around 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 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.
Breeding season	Furness (2015) defines breeding season as the period from modal return to the colony through to modal departure from the colony at the end of breeding, for birds at UK colonies.
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.
Non-breeding season	Furness (2015) defines non-breeding season as the remaining part of the year that is not a part of breeding season.
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
BDMPS	Biologically Defined Minimum Population Scales
BTO	British Trust for Ornithology
DAS	Digital aerial survey
EIA	Environmental impact assessment
HRA	Habitats Regulations Appraisal
JNCC	Joint Nature Conservation Committee
OASA	Offshore aerial survey area
OWF	Offshore wind farm
RIAA	Report to Inform Appropriate Assessment
SPA	Special Protection Area
WFDA	Wind Farm Development Area

1 Introduction

1. This Offshore Ornithology Apportioning Technical Report is an Appendix to **Chapter 10: Offshore Ornithology (Volume II)** of the Bellrock Wind Farm Development Area (WFDA) environmental impact assessment (EIA) Report and details the apportionment of seabird populations which use the Bellrock WFDA to:

   - Special Protection Areas (SPA) and other breeding colonies for which connectivity has been identified; and
   - Different age classes (considered here at the broad level of adults and subadults).

2. The outputs from this apportioning process are used to inform **Chapter 10: Offshore Ornithology (Volume II)** and the **Bellrock WFDA Report to Inform Appropriate Assessment** (**RIAA Part 3 (Volume VI)**).

3. Apportioning is undertaken to estimate the extent to which the predicted impacts from the Bellrock WFDA are distributed amongst the different breeding seabird colony populations which are identified as having connectivity to the Bellrock WFDA, with the focus being on those populations that are qualifying features (or named components of the breeding seabird assemblage qualifying feature) of colonies designated as SPAs (with connectivity to the different SPA populations as determined in the **Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report** (**RIAA Part 1: Annex A (Volume VI)**). In addition, apportioning is also undertaken to account for the extent to which the predicted impacts occur on the breeding adult and the subadult components of these populations, as well as on the regional breeding populations as defined for the Bellrock WFDA EIA Report (see **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**).

4. In relation to the apportioning to SPA breeding seabird colony populations, the potential impacts from a particular offshore wind farm (OWF) may be concentrated on a relatively small number of such populations during the breeding season. This is because foraging ranges are constrained by the colony location due to the need for the adult birds to return to the colony to attend nests and provision chicks (making seabirds central place foragers during the breeding season) (Orians and Pearson, 1979). By contrast, the distribution of seabirds from these colonies is not constrained in this way during the non-breeding periods, when they may be widely distributed across large expanses of sea and oceanic waters (Furness, 2015). Consequently, different approaches tend to be required for apportioning impacts to seabird populations during the breeding and non-breeding periods, as detailed in **Section 2** below.

5. The **Bellrock WFDA Scoping Report (Appendix 1.1 (Volume IV))** included an 'enhanced scoping' approach whereby (based on the first year of aerial survey data) breeding season apportioning of key species to SPA breeding colonies was undertaken using the 'theoretical approach' detailed in the NatureScot Interim Guidance (NatureScot, 2018). This apportioning technical report uses the full two years of aerial survey data and therefore updates and supersedes the apportioning presented in the **Bellrock WFDA Scoping Report (Appendix 1.1 (Volume IV))**.

2 Apportioning Approaches and Methods

2.1 Relevant Species and Colonies

6. **Chapter 5: EIA Methodology (Volume II)** provides a summary of the general impact assessment methodology applied in the Bellrock WFDA EIA Report. The assessment will use the conceptual 'source-pathway-receptor' model. The model identifies potential impacts resulting from the proposed activities on the environment and sensitive receptors within it.

7. The designated sites and qualifying features for which apportioning to SPA breeding colonies has been carried out for the Bellrock WFDA are presented in **Table 2.1**. This is on the basis that they encompass the qualifying features (or named components of the breeding seabird assemblage qualifying features) of seabird breeding colony SPAs that:

- Have been screened in for assessment in Stage 2 of the HRA process (**Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report** (**RIAA Part 1: Annex A (Volume VI)**) and **Part 3** of the **Bellrock WFDA Report to Inform Appropriate Assessment (RIAA (Volume VI)),** and
- Include the species which were recorded in greatest abundance during the two years of aerial surveys and/or for which estimation of collision and displacement mortality was undertaken (**Appendix 10.1: Offshore Ornithology Digital Aerial Survey Baseline Report (Volume IV)**, **Appendix 10.2: Offshore Ornithology Collision Risk Modelling Technical Report (Volume IV)** and **Appendix 10.3: Displacement Assessment Technical Report (Volume IV)**).

Table 2.1: Special Protection Area Colonies and Associated Qualifying Features Identified for Apportioning

Designated Site	Distance from WFDA (km)[1]	Qualifying Feature	Effect Pathway(s) Subject to Quantitative Assessment
Buchan Ness to Collieston Coast SPA	113	Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
Fowlsheugh SPA	122	Kittiwake (breeding)	▪ Collision ▪ Displacement/barrier effect
		Razorbill (breeding)[2]	▪ Displacement/barrier effect
Farne Islands SPA	154	Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
		Puffin (breeding)[2,3]	▪ Displacement/barrier effect

Designated Site	Distance from WFDA (km)[1]	Qualifying Feature	Effect Pathway(s) Subject to Quantitative Assessment
St Abb's Head to Fast Castle SPA	154	Kittiwake (breeding)	▪ Collision ▪ Displacement/barrier effect
Forth Islands SPA	158	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
		Puffin (breeding)[3]	▪ Displacement/barrier effect
		Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
		Razorbill (breeding) [2,4]	▪ Disturbance/displacement/ barrier effect
Troup, Pennan and Lion's Heads SPA	159	Kittiwake (breeding)	▪ Collision ▪ Displacement/barrier effect
		Razorbill (breeding)[2,4]	▪ Displacement/barrier effect
Coquet Island SPA	182	Puffin (breeding)[2,3]	▪ Disturbance/displacement/ barrier effect
East Caithness Cliffs SPA	238	Razorbill (breeding)[4]	▪ Displacement/barrier effect
		Kittiwake (breeding)	▪ Collision ▪ Displacement/barrier effect
		Great black-backed gull (breeding)[2,4]	▪ Collision
North Caithness Cliffs SPA	252	Razorbill (breeding)[2,4]	▪ Displacement/barrier effect
		Puffin (breeding)[2,3]	▪ Displacement/barrier effect
		Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
Copinsay SPA	264	Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
		Great black-backed gull (breeding)[2,4]	▪ Collision
Flamborough and Filey Coast SPA	280	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
		Razorbill (breeding)[4]	▪ Displacement/barrier effect
		Kittiwake (breeding)	▪ Collision ▪ Displacement/barrier effect

Designated Site	Distance from WFDA (km)[1]	Qualifying Feature	Effect Pathway(s) Subject to Quantitative Assessment
Hoy SPA	282	Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
Fair Isle SPA	300	Gannet (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
		Kittiwake (breeding)[2]	▪ Collision ▪ Displacement/barrier effect
Calf of Eday SPA	318	Great black-backed gull (breeding)[2,4]	▪ Collision
West Westray SPA	330	Kittiwake (breeding)[2,4]	▪ Collision ▪ Displacement/barrier effect
Sule Skerry and Sule Stack SPA	359	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
Noss SPA	361	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
North Rona and Sula Sgeir SPA	442	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
Hermaness, Saxa Vord and Valla Field SPA	457	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
St Kilda SPA	614	Gannet (breeding)	▪ Collision ▪ Displacement/barrier effect
Mingulay and Berneray SPA	639	Razorbill (breeding)[4]	▪ Displacement/barrier effect
Rathlin Island SPA	783	Razorbill (breeding)[4]	▪ Displacement/barrier effect

Notes:

[1] Taken as closest 'by-sea' distance from the nearest point of the SPA to the nearest point of the Bellrock WFDA (see Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report (**RIAA Part 1: Annex A, Volume VI**), noting that the apportioning calculations use the distance as measured centroid to centroid (see **Section 2.2**).

[2] Named component of the breeding seabird qualifying feature (as opposed to qualifying feature in its own right).

[3] Breeding SPA puffin populations are included on the basis of potential connectivity during the breeding season only because no quantitative assessment during the non-breeding period is required, in accordance with advice provided by NatureScot (email from NatureScot to the Applicant on 19 July 2024).

[4] Included on the basis of potential connectivity during the non-breeding season only.

8. Apportioning to SPA breeding colonies is undertaken for five species in total – i.e. kittiwake, great black-backed gull, razorbill, puffin and gannet. For great black-backed gull, this is limited to the non-breeding period, whilst for puffin it is limited to the breeding season (and for the remaining three species it is undertaken for both breeding and non-breeding periods) (**Table 2.1**). In accordance with the **Bellrock WFDA HRA Screening Report** (**RIAA Part 1: Annex A, Volume VI**) and NatureScot advice[1], guillemot and herring gull features from breeding colony SPAs have been screened out from further assessment (although assessment in relation to regional populations is still undertaken in **Chapter 10: Offshore Ornithology (Volume II)**). This is because of the absence of connectivity with the Bellrock WFDA (with all breeding colony SPAs being beyond the defined breeding season foraging range, which is also applied to determine connectivity with SPA populations of these species in the non-breeding periods due to expected limited dispersal).

2.2 Breeding Season

2.2.1 Breeding Colony Special Protection Areas

9. Apportioning of species to the respective SPA colony populations during the breeding season has been undertaken using the 'theoretical approach' described in NatureScot's interim guidance (NatureScot, 2018), and as agreed by NatureScot for use in the Bellrock WFDA assessment[2]. This apportioning calculation uses three weighting factors to estimate the contribution of the different SPA and non-SPA colonies to the population of breeding adult birds of each species occurring within the Bellrock WFDA during the breeding season (and hence the proportional allocation of predicted impacts to each of these colonies). These weighting factors are:

- The colony population size (of breeding adult birds);
- The distance of the centre of the colony by sea (i.e. circumventing land masses) from the centre of the Bellrock WFDA; and
- The proportion of sea within the area encompassed by a circle of radius equal to the defined breeding season foraging range[3] around the colony.

10. The by-sea distance to each colony and the proportion of foraging range around each colony comprising sea were both calculated using GIS. By-sea distances were squared (Distance^2), and the reciprocal for the proportion of foraging range as sea was taken (i.e. 1/Proportion of foraging range as sea).

[1] Minutes of Bellrock WFDA Scoping Workshop held on 30 October 2023 and email from NatureScot to the Applicant on 10 October 2024.

[2] Email from NatureScot to the Applicant on 9 September 2024.

[3] This is as detailed in Table 7.1 of the **Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report (RIAA Part 1: Annex A, Volume VI)** (following NatureScot 2023), with the mean maximum + 1 standard deviation foraging range (Woodward et al. 2019) used for kittiwake, razorbill, puffin and all but two of the relevant gannet colonies (for which the colony-specific maximum values are used).

11. For each species, the values of each of the three weighting factors were summed, with the weighting for each colony calculated using the following equation:

> *Weighting = (Colony population size / Sum of colony population size) x (Sum of Distance^2 / Colony Distance^2) x ((1 / Proportion of foraging range as sea) / Sum of (1 / Proportion of foraging range as sea)).*

12. Colony weightings were then expressed as a percentage of the sum of weighting values, to provide the percentage apportioning estimate for each breeding colony population.

13. For the purposes of this apportioning exercise, the colony population sizes for each species have been derived from the Seabirds Count census data (Burnell et al. 2023), which accords with the NatureScot representation on the Bellrock WFDA Scoping Opinion (**Appendix 1.2, Volume IV**). For each species, colony population sizes were derived for all SPA and non-SPA colonies that are identified as having connectivity with the Bellrock WFDA (as defined in the **Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report** (**RIAA Part 1: Annex A (Volume VI)**)). For razorbill, the colony count data have been included in the breeding season apportioning calculations (and subsequently presented in **Table 3.5**) with the correction factor of 1.34 applied to the counts of individuals (Burnell et al. 2023).

2.2.2 Age Class Apportioning

14. Seabirds are generally long-lived species that have delayed maturity, with some species taking up to six years or more to reach breeding age (e.g. Horswill and Robinson, 2015). Consequently, subadult (i.e. immature and juvenile) birds form a significant part of many seabird populations and a proportion of the birds that occur within, and in the vicinity of, the Bellrock WFDA are likely to be subadults. It is important to try to account for this within the overall apportioning process to avoid overestimating the impacts on the breeding adult component of populations, both in relation to SPA populations (as relevant to the **Bellrock WFDA RIAA Part 3 (Volume VI**) and the wider regional populations (as relevant to **Chapter 10: Offshore Ornithology (Volume II)**). Accounting for non-breeding birds in the apportioning process is likely to be of particular relevance to the Bellrock WFDA which, at a distance of approximately 116 km from the coast, is likely to be beyond the core breeding season foraging ranges of most seabird species from even the closest colonies (e.g. Wakefield et al. 2017), (Cleasby et al. 2018). As such, subadults and other non-breeders may be expected to form a relatively high proportion of the birds recorded within the Bellrock offshore aerial survey area (OASA).

15. Digital aerial survey (DAS) data can provide estimation of the broad age classes (i.e. adult, immature and/or juvenile) for gull species and gannet based upon plumage characteristics but it is only possible to determine this for a sample of the records (dependent on the 'quality' of the imagery), whilst for some of these species the resultant estimates are likely to be biased (see **Section 3.2** below). For other species (most notably the auks), DAS data cannot be used to distinguish age classes due to the absence of marked plumage variation. Data on the age classes of gull species and gannet were extracted from the DAS data for the Bellrock OASA, as detailed in **Appendix 10.1: Digital Aerial Survey Baseline Report (Volume IV)**. The resulting proportions of individuals identified as adults and subadults during the breeding season months are presented in **Section 3.2** (along with details of the sample sizes and proportion of records for which age class was determined).

16. Estimates of the proportional occurrence of different age classes within populations can also be derived from the stable age distributions produced from population models. Thus, age class distributions were extracted from the population models produced for kittiwake, guillemot, razorbill, puffin and gannet for the purposes of the Bellrock WFDA Population Viability Analyses (PVA) in **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**[4]. The age class distributions were extracted after the population model had run for a period of 10 years, at which point the proportions of each age class had stabilised. These, non-seasonally specific, estimates relate to the 'nominal' wider population (as opposed to being site-specific) and are also presented in **Section 3.2**.

2.3 Non-breeding Season

17. For all species listed in **Table 2.1** except puffin[5], apportioning to SPA breeding colonies during the non-breeding period(s) has been undertaken using the Biologically Defined Minimum Population Scales (BDMPS) approach developed by Furness (2015). This is in accordance with the **Bellrock WFDA Scoping Report (Appendix 1.1, Volume IV)** and as agreed in NatureScot's representation on the Bellrock WFDA Scoping Opinion (**Appendix 1.2 (Volume IV)**).

18. The BDMPS approach assumes that during the non-breeding period birds from SPA colonies disperse from the breeding site and are distributed evenly across the BDMPS region. The apportioning rate for each SPA has been calculated by dividing the number of breeding adults from the SPA estimated to be present within the BDMPS region by the total BDMPS population size. These calculations rely on the population size data provided in Furness (2015), which in the case of breeding colonies in Britain and Ireland derive from the Seabird 2000 census (Mitchell et al. 2004).

19. Furness (2015) also incorporates stable age distributions from population models to derive estimates of the associated subadult component of the populations within the BDMPS (with birds from the subadult age class also assumed to be evenly distributed across the BDMPS region). Therefore, no additional correction for age class is required for the non-breeding season apportioning. In relation to the Bellrock WFDA, the relevant BDMPS for razorbill and gannet is the UK North Sea and Channel waters, and the relevant BDMPS for kittiwake and great black-backed gull is the UK North Sea waters.

[4] The age distributions were derived from the models as run in deterministic mode (whereas the PVAs were undertaken with these models run in stochastic mode).

[5] In accordance with advice provided by NatureScot (email from NatureScot to the Applicant on 19 July 2024), no quantitative assessment for SPA breeding puffin populations is required during the non-breeding period, although the quantitative assessment of the regional population undertaken in **Chapter 10: Offshore Ornithology (Volume II)** encompasses non-breeding season impacts.

3 Results and Derivation of Apportioning Rates

3.1 Apportioning of Impacts to Special Protection Area Populations

3.1.1 Kittiwake

20. Twelve kittiwake SPA breeding populations are identified as having potential connectivity with the Bellrock WFDA during the breeding season (**Table 2.1**) and are included in the apportioning calculations, together with those non-SPA colonies which are also within breeding season foraging range (see Table A1 in **Annex A** of this Appendix for details). The apportioning calculations estimate that approximately 77% of the adult kittiwakes present in the Bellrock WFDA during this period derive from these SPA populations (**Table 3.1**). Of these SPA populations, Fowlsheugh SPA, Buchan Ness to Collieston Coast SPA and the Flamborough and Filey Coast SPA account for the majority of birds, with each of these colonies estimated to contribute close to, or slightly more than, 15% of the adult kittiwakes found in the Bellrock WFDA. Five other SPA populations (i.e. Troup, Pennan and Lion's Head SPA, East Caithness Cliffs SPA, St Abb's Head to Fast Castle SPA, Farne Islands SPA and Forth Islands SPA) are each estimated to contribute between 3% and 8% of the adult kittiwakes occurring on the Bellrock WFDA during the breeding season, with the contribution from each of the remaining four SPA populations being approximately 1% or less (**Table 3.1**).

21. During the post-breeding (or autumn) passage period, adult kittiwake from SPA populations with connectivity to the Bellrock WFDA are estimated to comprise almost 22% of the kittiwake using the Bellrock WFDA, with the subadult component of these SPA populations estimated to comprise almost 13% (**Table 3.2**). During the pre-breeding (or spring) passage period, the analogous percentages are 28% for the breeding adults and almost 13% for the subadults (**Table 3.3**). The largest apportioning values are for the East Caithness Cliffs SPA and Flamborough and Filey Coast SPA populations, with the adult birds in each case comprising 5% to 6% and 7% to 8% of the UK North Sea BDMPS population during the post-breeding and pre-breeding passage periods respectively. The adult birds from each of the remaining 10 SPA populations represent less than 2% of the passage period BDMPS populations in almost all cases, and frequently considerably less than 1% (**Table 3.2** and **Table 3.3**).

Table 3.1: Apportionment of Breeding Season Impacts at the Bellrock Wind Farm Development Area to Kittiwake Breeding Colonies

Colony	Breeding Population (Number of Adults)[1]	Distance by Sea from Bellrock WFDA (km)[2]	1 / Proportion of Foraging Range as Sea	Resulting Weight for Colony	Proportional Weight of Colony
Fowlsheugh SPA	28,078	135	1.496	0.2646	0.1846
Buchan Ness to Collieston Coast SPA	22,590	129	1.377	0.2157	0.1505
Flamborough and Filey Coast SPA	91,008	308	1.866	0.2069	0.1444
Troup, Pennan and Lion's Heads SPA	21,232	172	1.369	0.1127	0.0786
East Caithness Cliffs SPA	48,958	255	1.300	0.1126	0.0785
St Abb's Head to Fast Castle SPA	10,300	171	1.665	0.0675	0.0471
Farne Islands SPA	8,804	170	1.632	0.0573	0.0400
Forth Islands SPA	9,084	191	1.683	0.0481	0.0335
North Caithness Cliffs SPA	11,142	290	1.249	0.0190	0.0133
Copinsay SPA	1,910	280	1.204	0.0034	0.0024
Fair Isle SPA	896	315	1.092	0.0011	0.0008
Hoy SPA	532	306	1.215	0.0008	0.0006
Non-SPA Colonies	*58,855*	*131 – 296*[3]	*81.886*	*0.3238*	*0.2259*
Total	**313,389**	**-**	**99.034**	**1.4336**	**1.0000**

Notes:

[1] Derived by doubling the number of Apparently Occupied Sites (AOS)/Apparently Occupied Nests (AON) as given in Burnell et al. (2023).

[2] As measured from centroid of SPA to centroid of WFDA.

[3] Range of distances of non-SPA colonies from the Bellrock WFDA (see Table A1 in **Annex A** of this Appendix for details).

Table 3.2: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Kittiwake Special Protection Area Breeding Populations During the Post-breeding Passage Period (September to December)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Buchan Ness to Collieston Coast SPA	15,050	0.0181	8,830	0.0106
Fowlsheugh SPA	11,204	0.0135	6,573	0.0079
St Abb's Head to Fast Castle SPA	4,084	0.0049	2,396	0.0029
Farne Islands SPA	4,132	0.0050	2,424	0.0029
Forth Islands SPA	3,720	0.0045	2,182	0.0026
Troup, Pennan and Lion's Heads SPA	17,875	0.0215	10,487	0.0126
East Caithness Cliffs SPA	48,492	0.0584	28,449	0.0343
North Caithness Cliffs SPA	12,180	0.0147	7,146	0.0086
Copinsay SPA	799	0.0010	469	0.0006
Flamborough and Filey Coast SPA	45,140	0.0544	26,482	0.0319
Hoy SPA	476	0.0006	279	0.0003
Fair Isle SPA	925	0.0011	543	0.0007
West Westray SPA	14,466	0.0174	8,487	0.0102
Total for UK North Sea BDMPS	480,815	0.5793	349,122	0.4207
Number of Individuals of All Age Classes[1]: 829,937 829,937				

Notes:

[1] Population size estimates are from Furness (2015).

Table 3.3: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Kittiwake Special Protection Area Breeding Populations During the Pre-breeding Passage Period (January to mid-April)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Buchan Ness to Collieston Coast SPA	15,050	0.0240	6,622	0.0105
Fowlsheugh SPA	11,204	0.0178	4,930	0.0079
St Abb's Head to Fast Castle SPA	4,084	0.0065	1,797	0.0029
Farne Islands SPA	4,132	0.0066	1,818	0.0029
Forth Islands SPA	3,720	0.0059	1,637	0.0026
Troup, Pennan and Lion's Heads SPA	17,875	0.0285	7,865	0.0125
East Caithness Cliffs SPA	48,492	0.0772	21,336	0.0340
North Caithness Cliffs SPA	12,180	0.0194	5,359	0.0085
Copinsay SPA	799	0.0013	352	0.0006
Flamborough and Filey Coast SPA	45,140	0.0719	19,862	0.0316
Hoy SPA	476	0.0008	210	0.0003
Fair Isle SPA	925	0.0015	407	0.0006
West Westray SPA	14,466	0.0230	6,365	0.0101
Total for UK North Sea BDMPS	375,815	0.5986	252,001	0.4014
Number of Individuals of All Age Classes[1]: 627,816				

Notes:

[1] Population size estimates are from Furness (2015).

3.1.2 Great Black-backed Gull

22. Apportioning was undertaken in relation to three great black-backed gull SPA breeding populations (see **Table 2.1**) for the non-breeding period only, on the basis that potential connectivity with the Bellrock WFDA is limited to this period. Each of these SPA populations make a small contribution to the BDMPS population, with the adult birds comprising <1% in each case (**Table 3.4**).

Table 3.4: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Great Black-backed Gull Special Protection Area Breeding Populations During the Non-breeding Period (September to March)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
East Caithness Cliffs SPA	350	0.0038	441	0.0048
Copinsay SPA	436	0.0048	549	0.0060
Calf of Eday SPA	562	0.0061	708	0.0077
Total for UK North Sea BDMPS	**32,070**	**0.3509**	**59,329**	**0.6491**
Number of Individuals of All Age Classes[1]: 91,399				
Notes: [1] Population size estimates are from Furness (2015).				

3.1.3 Razorbill

23. The apportioning calculations for razorbill suggest that during the breeding season 72% of the adults present in the Bellrock WFDA derive from the Fowlsheugh SPA population (**Table 3.5**), which is the only SPA breeding razorbill population identified as having potential connectivity with the Bellrock WFDA during the breeding season (**Table 2.1**). The remaining adult razorbills occurring at the Bellrock WFDA during the breeding season are considered to derive from two non-SPA colonies, with the Buchan Ness to Collieston Coast SPA (for which razorbill is neither a qualifying feature nor a named component of a seabird assemblage feature) contributing almost all of these (Table A2 in **Annex A** of this Appendix).

24. A further seven razorbill SPA breeding populations are included in the apportioning calculations for the non-breeding periods (**Table 2.1**). During both of the passage periods and the wintering period, the adult birds from these eight SPA populations are estimated to comprise 10% to 11% of the razorbill using the Bellrock WFDA, with the associated subadult component of these populations estimated to comprise approximately 8% during the passage periods and 3% during the wintering period (**Table 3.6** and **Table 3.7**). The largest apportioning values are for the East Caithness Cliffs SPA and Flamborough and Filey Coast SPA populations, with the adult birds comprising 3% to 4% of the UK North Sea and Channel BDMPS population in each case during the non-breeding

periods. The adult birds from the other six SPA populations represent 1% or less of the BDMPS population during the non-breeding periods (**Table 3.6** and **Table 3.7**).

Table 3.5: Apportionment of Breeding Season Impacts at the Bellrock Wind Farm Development Area to Razorbill Breeding Colonies

Colony	Breeding Population (Number of Adults)[1]	Distance from Bellrock WFDA (km)[2]	1 / Proportion of Foraging Range as Sea	Resulting Weight for Colony	Proportional Weight of Colony
Fowlsheugh SPA	18,844	135	1.671	0.7521	0.7243
Non-SPA colonies	8,005	129 - 1333	2.819	0.2863	0.2757
Total	**26,849**	**-**	**4.490**	**1.0384**	**1.0000**

Notes:

[1] Number of individuals multiplied by the 1.34 correction factor (Burnell et al. 2023).

[2] As measured from centroid of SPA to centroid of WFDA.

[3] Range of distances of non-SPA colonies from the Bellrock WFDA (see **Table A2** in **Annex A** of this Appendix for details).

Table 3.6: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Razorbill Special Protection Area Breeding Populations During the Passage Periods (Mid-August to October and January to March)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Apportioning Value
Fowlsheugh SPA	7,048	0.0119	4,757	0.0080
Forth Islands SPA	5,250	0.0089	3,544	0.0060
Troup, Pennan and Lion's Heads SPA	3,486	0.0059	2,353	0.0040
East Caithness Cliffs SPA	25,000	0.0422	16,875	0.0285
North Caithness Cliffs SPA	3,230	0.0055	2,295	0.0039
Flamborough and Filey Coast SPA	20,002	0.0338	13,501	0.0228
Mingulay and Berneray SPA	404	0.0007	758	0.0013
Rathlin Island SPA	616	0.0010	1,154	0.0019
Total for UK North Sea and Channel BDMPS	**302,314**	**0.5108**	**289,560**	**0.4892**
Number of Individuals of All Age Classes[1]: 591,874				
Notes:				

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Apportioning Value
[1] Population size estimates are from Furness (2015).				

Table 3.7: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Razorbill Special Protection Area Breeding Populations During the Winter Period (November and December)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Fowlsheugh SPA	2,114	0.0097	529	0.0024
Forth Islands SPA	1,575	0.0072	394	0.0018
Troup, Pennan and Lion's Heads SPA	1,046	0.0048	261	0.0012
East Caithness Cliffs SPA	7,500	0.0343	1875	0.0086
North Caithness Cliffs SPA	1,020	0.0047	255	0.0012
Flamborough and Filey Coast SPA	6,001	0.0274	1500	0.0069
Mingulay and Berneray SPA	2,022	0.0092	758	0.0035
Rathlin Island SPA	1,539	0.0070	0	0.0000
Total UK North Sea and Channel BDMPS	**106,183**	**0.4857**	**112,439**	**0.5143**
Number of Individuals of All Age Classes[1]: 218,622				
Notes: [1] Population size estimates are from Furness (2015).				

3.1.4 Puffin

25. Four puffin SPA breeding populations are identified as having potential connectivity with the Bellrock WFDA during the breeding season (**Table 2.1**) and are included in the apportioning calculations together with those non-SPA colonies which are also within breeding season foraging range (see Table A3 in **Annex A** of this Appendix for details). Almost all (i.e. 98%) adult puffins present in the Bellrock WFDA during the breeding season are estimated to derive from these four SPA populations, with the Farne Islands SPA, Forth Islands SPA, Coquet Island SPA and North Caithness Cliffs SPA estimated to contribute 43%, 36%, 19% and less than 1%, respectively (**Table 3.8)**

26. Apportioning is not undertaken during the non-breeding period for puffin following advice from NatureScot that a quantitative assessment for SPA populations is not required for the non-breeding period (due to the rapid and widespread post-breeding dispersal)[6].

[6] Email from NatureScot to the Applicant on 19 July 2024.

Table 3.8: Apportionment of Breeding Season Impacts at the Bellrock Wind Farm Development Area to Puffin Breeding Colonies

Colony	Breeding Population (Number of Adults)[1]	Distance from Bellrock WFDA (km)[2]	1 / Proportion of Foraging Range as Sea	Resulting Weight for Colony	Proportional Weight of Colony
Farne Islands SPA	87,504	170	1.707	0.4262	0.4327
Forth Islands SPA	85,846	191	1.816	0.3507	0.3561
Coquet Island SPA	50,058	195	1.732	0.1891	0.1919
North Caithness Cliffs SPA	3,039	299	1.273	0.0039	0.0036
Non-SPA colonies	4,482	131-2,593	26.602	0.0154	0.0157
Total	**227,890**	**-**	**31**	**0.9814**	**1.0000**

Notes:

[1] Derived by doubling the number of AOB where the count unit is AOB, or by taking the number of individuals where post-laying individuals is the count unit, as given in Burnell et al. (2023).

[2] As measured from centroid of SPA to centroid of WFDA.

[3] Range of distances of non-SPA colonies from the Bellrock WFDA. Details of apportionment for these colonies is presented in **Annex A.**

3.1.5 Gannet

27. Eight gannet SPA breeding populations are identified as having potential connectivity with the Bellrock WFDA during the breeding season (**Table 2.1**) and are included in the apportioning calculations, together with those non-SPA colonies which are also within breeding season foraging range (see Table A4 in **Annex A** of this Appendix for details). The apportioning calculations estimate that 94% of the adult gannets present in the Bellrock WFDA during the breeding season derive from these SPA populations (**Table 3.9**). The Forth Islands SPA makes the greatest contribution of any colony population, accounting for 72% of the adult gannets in the Bellrock WFDA during the breeding season. Other SPA populations make much smaller contributions (all less than 10%).

28. Apportioning during the non-breeding passage periods involves the same gannet SPA populations as for the breeding season (**Table 2.1**). During the post-breeding passage period, adult gannet from SPA populations with connectivity to the Bellrock WFDA are estimated to comprise 46% of the gannets using the Bellrock WFDA, with the subadult component of these SPA populations estimated to comprise 37% (**Table 3.10**) During the pre-breeding passage period, the analogous percentages are 59% for the breeding adults and 27% for the subadults (**Table 3.11**). The largest apportioning values are for the Forth Islands SPA population, with the adult birds from this SPA estimated to contribute 24% and 31% of the of the UK North Sea and Channel BDMPS population during the post-breeding and pre-breeding passage periods, respectively. The adult birds from each of the remaining seven SPAs represent smaller percentages of the passage period

populations. With the exception of the Hermaness, Saxa Vord and Valla Field SPA population during pre-breeding passage period (for which the adult birds are estimated to comprise 14%), the contribution of each of these SPA populations is less than 10% of the BDMPS population (**Table 3.10** and **Table 3.11**).

Table 3.9: Apportionment of Breeding Season Impacts at the Bellrock Wind Farm Development Area to Gannet Breeding Colonies

Colony	Breeding Population (Number of Adults)[1]	Distance from Bellrock WFDA (km)[2]	1 / Proportion of Foraging Range as Sea	Resulting Weight for Colony	Proportional Weight of Colony
Forth Islands SPA	150,518	191	1.420	1.4051	0.7226
Flamborough and Filey Coast SPA	26,784	299	1.658	0.1201	0.0618
St Kilda SPA	120,580	634	1.164	0.0842	0.0433
Hermaness, Saxa Vord and Valla Field SPA	51,160	449	1.162	0.0285	0.0366
Noss SPA	27,530	372	1.178	0.0374	0.0290
Sule Skerry and Sule Stack SPA	18,130	365	1.139	0.0565	0.0192
North Rona and Sula Sgeir SPA	22,460	448	1.133	0.0305	0.0157
Fair Isle SPA	9,942	315	1.175	0.0711	0.0146
Non-SPA colonies	*17,344*	*171-386*[3]	*6.062*	*0.1112*	*0.0572*
Total	**444,448**	**-**	**16.091**	**1.9445**	**1.0000**

Notes:

[1] Derived by doubling the number of AOS/AON, as given in Burnell et al. (2023) except for Hermaness, Saxa Vord and Valla Field SPA and North Rona and Sula Sgeir SPA, which are as given for the Seabirds Count estimates in the Seabird Monitoring Programme (SMP) database (Joint Nature Conservation Committee (JNCC) and British Trust for Ornithology (BTO), 2025)).

[2] As measured from centroid of SPA to centroid of WFDA.

[3] Range of distances of non-SPA colonies from the Bellrock WFDA (see Table A4 in **Annex A** of this Appendix for details).

Table 3.10: Apportionment of Impacts at the Bellrock Wind Farm Development Area to Gannet Special Protection Area Breeding Populations During the Post-breeding Passage Period (October to November)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Forth Islands SPA	110,964	0.2432	80,893	0.1773
Flamborough and Filey Coast SPA	22,122	0.0485	16,127	0.0353
Fair Isle SPA	6,278	0.0138	5,086	0.0111
Sule Skerry and Sule Stack SPA	935	0.0020	1,515	0.0033
Noss SPA	15,627	0.0342	12,658	0.0277
North Rona and Sula Sgeir SPA	1,845	0.0040	2,989	0.0066
Hermaness, Saxa Vord and Valla Field SPA	38,965	0.0854	31,561	0.0692
St Kilda SPA	11,924	0.0261	19,318	0.0423
Total for UK North Sea and Channel BDMPS	**242,340**	**0.5311**	**213,959**	**0.4689**
Number of Individuals of All Age Classes[1]: 456,299				
Notes: [1] Population size estimates are from Furness (2015).				

Table 3.11: Apportionment of Gannet Impacts at the Bellrock WFDA to Gannet Special Protection Area Breeding Populations During the Pre-breeding Passage Period (December to mid-March)

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Forth Islands SPA	77,675	0.3127	35,952	0.1447
Flamborough and Filey Coast SPA	15,485	0.0623	7,168	0.0289
Fair Isle SPA	5,494	0.0221	2,543	0.0102
Sule Skerry and Sule Stack SPA	0	0.0000	0	0.0000
Noss SPA	13,674	0.0551	6,329	0.0255
North Rona and Sula Sgeir SPA	0	0.0000	0	0.0000

Colony	Adults		Subadults	
	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population	Number of Individuals Within BDMPS[1]	Proportion of BDMPS Population
Hermaness, Saxa Vord and Valla Field SPA	34,094	0.1373	15,781	0.0635
St Kilda SPA	0	0.0000	0	0.0000
Total for UK North Sea and Channel BDMPS	**163,701**	**0.6590**	**84,684**	**0.3409**
Number of Individuals of All Age Classes[1]: 248,385				
Notes: [1] Population size estimates are from Furness (2015).				

3.2 Age Class Apportioning

29. **Table 3.12** presents the breeding season percentages of adult and subadult kittiwakes, and gannets, as determined from plumage characteristics of the birds recorded during the DAS of the Bellrock OASA (with these percentages being as presented in Table 3.4 and Table 3.5 in **Appendix 10.1: Digital Aerial Survey Baseline Report (Volume IV)**. There were no records of great black-backed gull and only a single record of herring gull (assigned as an adult based on plumage) in the DAS data during the defined breeding seasons for each of these species (Table 3.7 and Table 3.10 in **Appendix 10.1: Digital Aerial Survey Baseline Technical Report (Volume IV)**).

Table 3.12: Occurrence of Adults Amongst the Kittiwake and Gannet Recorded in the Digital Aerial Survey During the Breeding Season, as Determined from Plumage Characteristics[1]

Species	Number Aged as:		Number of Unaged Birds	Total Number of Birds Recorded	Percentage of Birds for which Age Class Determined	Percentage of Adults (from Aged Sample Only)
	Adults	Subadults				
Kittiwake	116	7	36	159	77.4%	94.3%
Gannet	180	5	23	208	88.9%	97.3%
Notes: [1] As detailed in **Appendix 10.1: Digital Aerial Survey Baseline Technical Report (Volume IV).**						

30. The majority of kittiwakes breed for the first time at four years of age but adopt adult plumage from an earlier age (Coulson, 2011), (Olsen and Larsson, 2003). Consequently, DAS data are unlikely to distinguish second and third year birds from birds of breeding age, resulting in a likely overestimation in the proportion of breeding adult kittiwake. Thus, the percentage of breeding adults using the Bellrock WFDA is likely to be less than the estimated 94% (**Table 3.12**), with this

estimate increasing the precaution in the kittiwake assessment. The extent of overestimation is unknown but could be substantial, given that stable age distributions from population models for kittiwake suggest that approximately only 50% of the wider population comprises breeding adults (e.g. **Table 3.13**, Furness, 2015), whilst concentrations of adult birds during the breeding season are less likely at the Bellrock WFDA (which is more than 100 km from the closest colonies) than in waters closer to colonies (Wakefield et al. 2017).

31. The percentages of adult birds estimated to occur in the 'nominal' wider populations of the five species for which population models have been produced are presented in **Table 3.13**. These are derived from the stable age distributions of the population models undertaken for each of these species, with multiple estimates given for kittiwake, puffin and gannet because models have been run using different breeding productivity estimates (based on the values in Horswill and Robinson (2015) which are considered most appropriate to each population - see **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)** for details).

Table 3.13: Estimated Occurrence of Breeding Adults in Populations of Five Seabird Species as Derived from the Stable Age Distributions of Population Models

Species	Breeding Productivity Rate (Fledged Chicks per Pair) and Populations to Which Rates Applied[1]	Percentage of Breeding Adults
Kittiwake	0.819 (East Region value - applied to 13 modelled populations)	45.6%
	0.690 (Average national value - applied to Fair Isle SPA population)	49.3%
Guillemot	0.659 (East Region value – applied to all modelled populations)	50.6%
Razorbill	0.643 (Mid Region value – applied to all modelled populations)	48.1%
Puffin	0.415 (Farne Islands value - applied to Farne Islands SPA and Coquet Island SPA populations)	54.9%
	0.642 (Isle of May value - applied to Forth Islands SPA population)	45.4%
	0.617 (National Average value - applied to North Caithness Cliffs SPA and Regional populations)	46.3%
Gannet	0.698 (East Region value - applied to seven modelled populations)	55.0%
	0.710 (West Region value - applied to North Rona and Sula Sgeir SPA population)	54.6%

Notes:

[1] Breeding productivity rates used in the population models are from Horswill and Robinson (2015), as are the other demographic rates used in the models (with the values of the other demographic rates being the same for the different populations of each species). Details of the different populations of each species for which population models are produced are given in **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV).**

32. In accordance with **Bellrock WFDA Scoping Report (Appendix 1.1 (Volume IV))**, breeding season impacts to kittiwake and gannet are apportioned to the adult age class according to the DAS-derived estimates in **Table 3.12**, whilst for guillemot, razorbill and puffin they are apportioned to the adult age class according to the stable age distribution estimates in **Table 3.13**.

3.3 Sabbaticals

33. During a given breeding season, it is expected that a proportion of the breeding adults from a seabird population will not attempt to breed and take a 'sabbatical' year (but return to breed in subsequent years) (Horswill and Robinson, 2015). Thus, estimates of the percentage of 'sabbaticals' for each species are applied in the relevant assessments to account for this, noting that the breeding season and age class apportioning values presented in **Section 3.1** and **Section 3.2** exclude this correction.

34. Sabbatical rates used for the assessment, as set out in the **Bellrock WFDA Scoping Report (Appendix 1.1 (Volume IV))**, are as follows:

- Kittiwake and gannet: 10%;
- Great black-backed gull: 35%; and
- Guillemot, razorbill and puffin: 7%.

3.4 Apportioning Impacts to the Different Age Classes of Special Protection Area Populations

35. Breeding season impacts are apportioned to the breeding adults of SPA populations by combining the breeding season apportioning value for a particular SPA population (**Section 3.1**) with, first, the relevant apportioning value for the adult age class of that species (or, in some cases, specific SPA population) (**Section 3.2**) and, secondly, the appropriate species-specific sabbatical rate (**Section 3.3**). For example, the breeding season apportioning value for breeding adult kittiwake from the Fowlsheugh SPA is 0.157 (obtained by multiplying the values of 0.1846 (**Table 3.1**), 0.943 (**Table 3.12**) and 0.90 (**Section 3.3**)), whilst for breeding adult puffin from the Farne Islands SPA it is 0.221 (obtained by multiplying the values of 0.4327 (**Table 3.8**), 0.549 (**Table 3.13**) and 0.93 (**Section 3.3**)). To apportion breeding season impacts to the subadult age class of SPA populations (required to provide one of the inputs to the Bellrock PVAs - see **Appendix 10.4: Population Viability Analysis Technical Report (Volume IV)**), the breeding season apportioning value for a particular SPA population (**Section 3.1**) is combined with the relevant apportioning value for the subadult age class of that species (or, in some cases, specific SPA population)[7] (**Section 3.2**).

36. As outlined and explained in **Section 2.3**, the apportioning values for the breeding adult and the subadult components of SPA populations during the non-breeding periods are obtained directly from the values presented in the relevant tables in the species sections of **Section 3.1**.

[7] **Table** 3.12 and **Table 3.13** only give the proportion of adults but the proportion of subadults is simply 1 minus the adult proportion.

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Annex A: Apportioning Results for Non-SPA Colonies

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Table A1: Breeding Season Apportioning Results for Kittiwake to Non-Special Protection Area Colonies (Including Special Protection Areas at Which it is not a Qualifying Feature or Named Component of the Breeding Seabird Assemblage Feature)

Site	Breeding Population (Number of Adults)	Distance from Bellrock WFDA (km)[1]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
Firth of Forth (SPA)	2,310	184	1.693	0.0180	1.08%
Ythan Estuary, Sands of Forvie and Meikle Loch (SPA)	774	133	1.416	0.0097	0.58%
Pentland Firth Islands (SPA)	262	275	1.231	0.0007	0.04%
Auskerry (SPA)	0	288	1.186	0.0000	0.00%
Coquet Island (SPA)	932	195	1.682	0.0065	0.04%
Girdle Ness to Hare Ness	4,186	131	1.455	0.0559	3.35%
Catterline to Inverbervie	4,093	138	1.503	0.0506	3.03%
Lunan Bay to Arbroath	3,302	158	1.559	0.0323	1.94%
Findon Ness - Hare Ness	2,354	132	1.464	0.0312	1.87%
Burn of Daff	2,186	133	1.47	0.0286	1.72%
Berwick to Scottish Border	3,054	172	1.662	0.0268	1.61%
Marsden Bay	4,776	225	1.739	0.0258	1.55%
Scarborough to Osgodby Point	5,918	287	1.724	0.0195	1.17%
Howick - Cullornose Point - Dunstanburgh Castle Point	2,136	184	1.662	0.0165	0.99%
River Tyne to Seaton Sluice	2,514	234	1.769	0.0128	0.77%
Eyemouth to Burnmouth	1,418	170	1.662	0.0127	0.76%
Boulby Cliffs	2,880	259	1.739	0.0117	0.70%
Saltburn Coast	2,220	259	1.747	0.0091	0.54%
Stonehaven to Wine Cove	621	136	1.49	0.0078	0.47%

Site	Breeding Population (Number of Adults)	Distance from Bellrock WFDA (km)[1]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
Newtonhill - Hall Bay	596	134	1.475	0.0077	0.46%
Montrose to Lunan Bay	740	156	1.544	0.0073	0.44%
Carr Craig, Eyebroughy and Haystack	1,130	222	1.738	0.0062	0.37%
Staithes to Sandsend	1,562	262	1.722	0.0062	0.37%
Portsoy to Cullen	1,032	200	1.383	0.0056	0.34%
Cayton Bay to Filey	1,580	291	1.72	0.0050	0.30%
Hopeman Bay	1,120	240	1.384	0.0042	0.25%
Whitby to Robin Hood's Bay	946	266	1.713	0.0036	0.22%
Seahouses	412	175	1.646	0.0035	0.21%
River Tees Mouth	754	259	1.771	0.0031	0.19%
Hall Bay to Craigeven Bay	158	135	1.482	0.0020	0.12%
North Sutor to Shandwick	578	275	1.381	0.0017	0.10%
Fraserburgh	162	155	1.354	0.0014	0.09%
Hartlepool Fish Quay	322	251	1.758	0.0014	0.08%
Melvich to Duncansby Stacks SSSI	554	291	1.244	0.0013	0.08%
Peterhead	66	132	1.373	0.0008	0.05%
Stronsay	315	294	1.179	0.0007	0.04%
Rosehearty to Bay of Cullen	56	179	1.374	0.0004	0.02%
Horse of Copinsay	144	280	1.202	0.0003	0.02%
Portknockie	62	207	1.382	0.0003	0.02%
Scalby to Rocky Point	90	281	1.719	0.0003	0.02%
South Sutor	106	275	1.384	0.0003	0.02%
Caithness - Wick Bay to Freshwick Bay	90	259	1.265	0.0003	0.02%

Site	Breeding Population (Number of Adults)	Distance from Bellrock WFDA (km)[1]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
South Ronaldsay	102	281	1.225	0.0002	0.01%
Hartlepool	48	250	1.76	0.0002	0.01%
Hoy and Southwalls	66	288	1.229	0.0002	0.01%
Scapa Bay to St. Marys	46	293	1.206	0.0001	0.01%
Shapinsay (Coastal)	34	296	1.193	0.0001	0.00%
Holm	28	284	1.207	0.0001	0.00%
Newton Hill	4	135	1.48	0.0001	0.00%
Deerness	10	287	1.197	0.0000	0.00%
Rerwick Head to Mirkady Point	6	292	1.197	0.0000	0.00%
Fishtown of Usan to River North Esk	0	153	1.538	0.0000	0.00%
Ravenscar to Robin Hood's Bay	0	271	1.719	0.0000	0.00%
St Abbs to Eyemouth	0	170	1.664	0.0000	0.00%
Switha	0	286	1.225	0.0000	0.00%

Notes:

[1] As measured from centroid of SPA to centroid of WFDA.

Table A2: Breeding Season Apportioning Results for Razorbill to Non-Special Protection Area Colonies (Including Special Protection Areas at Which it is not a Qualifying Feature or Named Component of the Breeding Seabird Assemblage Feature)

Site	Breeding Population (Number of Adults)[1]	Distance from Bellrock WFDA (km)[2]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
Buchan Ness to Collieston Coast (SPA)	7,807	129	1.36	0.2792	26.88%
Ythan Estuary, Sands of Forvie and Meikle Loch (SPA)	1,98	133	1.459	0.0071	0.69%

Notes:

[1] Number of individuals multiplied by the 1.34 correction factor (Burnell et al. 2023).

[2] As measured from centroid of SPA to centroid of WFDA.

Table A3: Breeding Season Apportioning Results for Puffin to Non-Special Protection Area Colonies (Including Special Protection Areas at Which it is not a Qualifying Feature or Named Component of the Breeding Seabird Assemblage Feature)

Site	Breeding Population (Number of Adults)	Distance from Bellrock WFDA (km)[1]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
Fowlsheugh (SPA)	178	135	1.606	0.0013	0.13%
Buchan Ness to Collieston Coast (SPA)	182	129	1.411	0.0013	0.13%
East Caithness Cliffs (SPA)	189	255	1.34	0.0003	0.03%
Troup, Pennan and Lion's Heads (SPA)	30	172	1.413	0.0001	0.01%
St Abb's Head to Fast Castle (SPA)	0	171	1.746	0.0000	0.00%
Carr Craig, Eyebroughy and Haystack	3,800	222	1.876	0.0119	1.21%
Lunan Bay to Arbroath	26	158	1.707	0.0001	0.01%
Findon Ness - Hare Ness	19	132	1.551	0.0001	0.01%
Portsoy to Cullen	32	200	1.446	0.0001	0.01%
Catterline to Inverbervie	10	138	1.623	0.0001	0.01%
Burn of Daff	7	133	1.562	0.0001	0.01%
Newtonhill - Hall Bay	3	134	1.569	0.0000	0.00%
Newton Hill	2	135	1.577	0.0000	0.00%
Stonehaven to Wine Cove	1	136	1.597	0.0000	0.00%
Caithness - Wick Bay to Freshwick Bay	3	259	1.299	0.0000	0.00%
Eyemouth to Burnmouth	0	170	1.74	0.0000	0.00%
Girdle Ness to Hare Ness	0	131	1.539	0.0000	0.00%

Notes:

[1] As measured from centroid of SPA to centroid of WFDA.

Table A4: Breeding Season Apportioning Results for Gannet at Non-Special Protection Area Colonies (Including Special Protection Areas at Which it is not a Qualifying Feature or Named Component of the Breeding Seabird Assemblage Feature)

Site	Breeding Population (Number of Adults)	Distance from Bellrock WFDA (km)[1]	1 / Proportion of Foraging Range at Sea	Resulting Weight for Colony	Apportioning Value
Troup, Pennan and Lion's Heads (SPA)	9,650	172	1.214	0.1077	5.1%
Foula (SPA)	4,886	386	1.140	0.0102	0.5%
Noup Cliffs (West Westray SPA)	2,768	329	1.133	0.0079	0.4%
St Abb's Head to Fast Castle (SPA)	22	171	1.445	0.0003	0.0%
Marwick Head (SPA)	18	326	1.130	0.0001	0.0%

Notes:

[1] As measured from centroid of SPA to centroid of WFDA.