Technical Appendix 11.6: Apportioning for HRA

MachairWind Offshore Ornithology

ScottishPower Renewables (SPR)

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1.0 Introduction

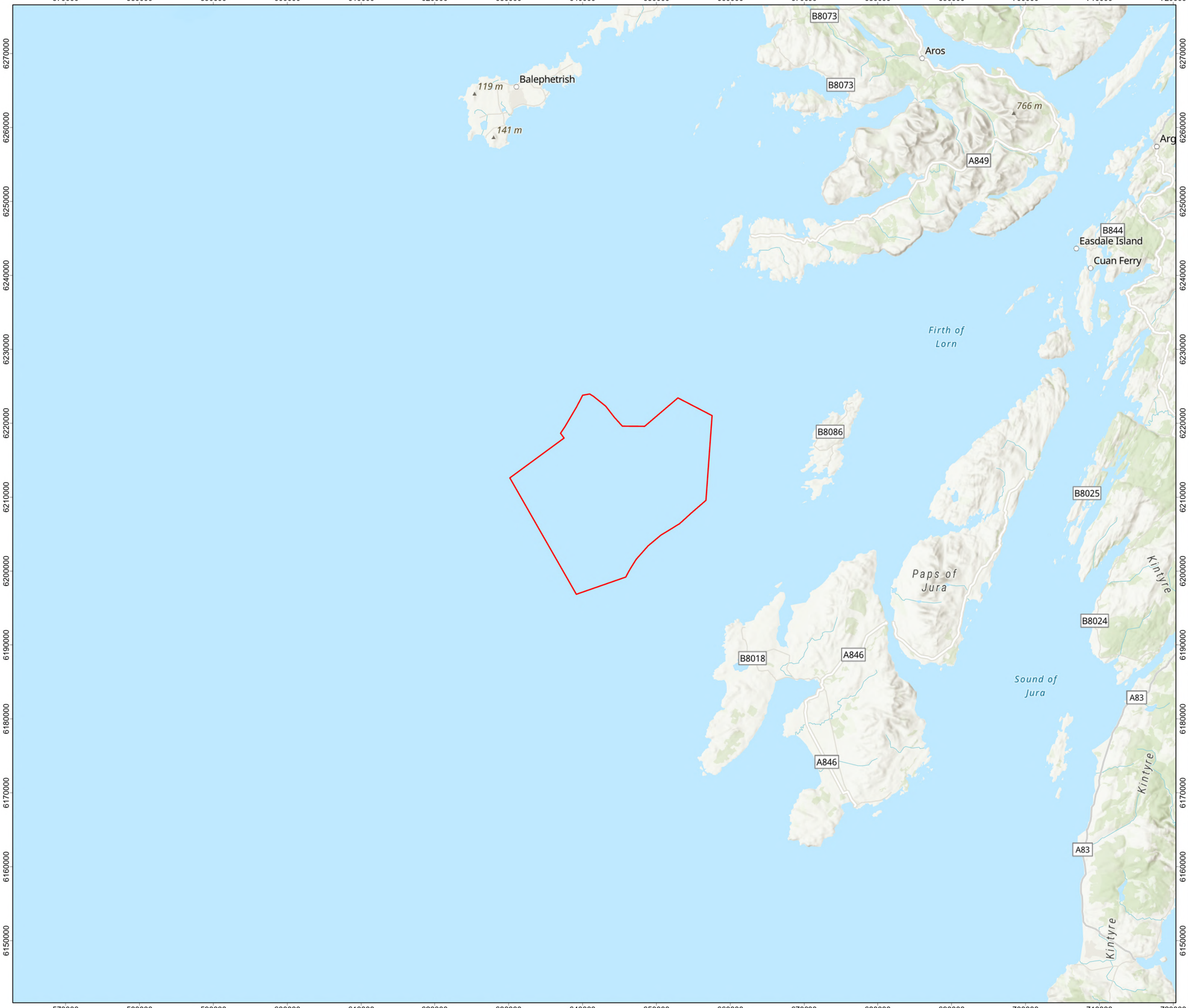
1.1 Project summary

1. MachairWind Limited ('the Applicant') is proposing the development of the MachairWind Windfarm ('the Project'), an Offshore Windfarm, located off the west coast of Scotland approximately 15 kilometres (km) to the northwest of Islay and approximately 12.4 km west of Colonsay at the closest points (**Figure 1**).
2. The Offshore Project will comprise up to 144 wind turbine generators (WTGs) with fixed-bottom foundations. The area within which the infrastructure will be located is the Windfarm Development Area (WDA). The WDA covers an area of 448 km^2.

1.2 Purpose of this report

3. This **Technical Appendix 11.6: Apportioning for HRA** report apportions collision and displacement mortalities that have been estimated for the WDA-alone that could occur during Project construction, operation and maintenance (O&M) and decommissioning activities to Special Protection Area (SPA) populations. Collision and displacement mortality estimates for the WDA-alone (presented in **Technical Appendix 11.3: Collision Risk Modelling** and **Technical Appendix 11.4: Displacement** respectively) were apportioned to SPAs using apportioning weightings calculated and presented in this technical appendix for each SPA population for the breeding and non-breeding season.
4. Details of collision and displacement mortalities apportioned from other offshore windfarms to the same SPAs impacted by the Project, for the in-combination assessment, are presented in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.
5. In addition to providing SPA weightings followed by apportioning WDA-alone mortality, this technical appendix also presents the change in adult baseline mortality for each SPA population as a result of the additional offshore windfarm mortality from the WDA-alone and in-combination offshore windfarms.
6. If the change in adult baseline mortality exceeds a threshold advised by NatureScot, the consequences of the additional mortality on SPA populations should be assessed using Population Viability (PVA) methods. This technical appendix states whether or not a PVA meets the threshold for each SPA population. All PVA methods as well as PVA input and outputs for each SPA population (where a PVA is required) are provided in **Technical Appendix 11.7: Population Viability Analysis**.
7. The apportioning process described in this report is only relevant to the Habitats Regulations Appraisal (HRA[1]) process which requires, under the Habitats Regulations, the assessment of whether any plan or project could affect a European Site, i.e. an SPA or Special Area of Conservation (SAC). The Environmental Impact Assessment (EIA) process requires assessment of impacts on regional populations, not individual SPA populations. Therefore, this report is only of relevance to the RIAA and not **Chapter 11 Offshore Ornithology** Environmental Impact Assessment Report (EIAR). Key information presented in this report is summarised in the RIAA.

[1] Habitats Regulations Appraisal (HRA) | NatureScot



Windfarm Development Area (WDA)

N

0 5 10 20
Kilometres

REV	REV DATE	GIS CREATOR	GIS REVIEWER	TECHNICAL CHECKER	TECHNICAL APPROVER
1	21/04/2026	MMM	MMM	NG/SO	NG/SO

DRAWING NJMBER	MCW-DWF-ENV-MAP-RHS-000203		
DATUM	ETRS89	PROJECTION	UTM Zone 29N
SCALE	1:500,000	PAGE SIZE	A3
PROJECT TITLE	MachairWind		
DRAWING TITLE	**MachairWind** **Windfarm Development Area**		

NOT TO BE USED FOR NAVIGATION

MacArthur Green | PART OF SLR

ScottishPower Renewables

2.0 Apportioning methods

2.1 Species

8. Estimated collision and displacement mortality, which could occur during Project operation, was apportioned to SPA populations. Collision impacts were estimated for kittiwake, great black-backed gull, herring gull, Arctic tern, common tern and gannet (**Technical Appendix 11.3: Collision Risk Modelling**). Displacement impacts were estimated for kittiwake, Arctic tern, common tern, guillemot, razorbill, puffin, fulmar, and gannet (**Technical Appendix 11.4: Displacement**).

9. Breeding season mortalities were not apportioned to SPAs for Arctic tern, common tern and great black-backed gull due to there being no SPAs with these species as qualifying features or named components of seabird assemblages within these species' foraging ranges (refer to the **HRA Screening Report** for details). However, all three of these species were present in the WDA during the non-breeding season (**Technical Appendix 11.2: Baseline Site Characterisation)**, so non-breeding season mortalities were apportioned to SPAs within the species-specific Western BDMPS region for these species (refer to **Section 2.3**).

10. Herring gull was screened into the HRA Screening Report as theoretical connectivity with Rathlin SPA was predicted as, based on NatureScot advice (in their response to the Scoping Report, 22 November 2024), this SPA is within the shortest mean maximum plus 1 Standard Deviation (SD) foraging distance (mean max + SD = 85.6 km) between the boundary of the WDA and the boundary of the SPA (boundary edge to edge distance = 70 km). However, at the apportioning stage, following the approach to apportioning advised by NatureScot, 22 November 2024 (refer to **Section 2.2.2)**, herring gull breeding season mortalities were not apportioned to Rathlin Island SPA as it was not within foraging range from the geometric centre of the WDA to the geometric centre of any SPA (centre to centre distance = 89.6 km). NatureScot advise that herring gulls are non-migratory and that the same approach to apportioning non-breeding season mortalities should be used as for apportioning breeding season (NatureScot response to the Scoping Report, 22 November 2024). Consequently, as there were no SPAs within foraging range of the WDA, there were no SPAs to which non-breeding season mortality could be apportioned. Therefore, WDA-alone herring gull mortality has not been apportioned to any SPAs with herring gull as a qualifying feature.

11. WDA-alone collision and displacement mortalities were apportioned to SPAs for nine species; **Table 1** summarises for each species if breeding and/or non-breeding season mortality was apportioned to SPAs.

Table 1: Summary of species for which estimated collision and displacement mortalities in the breeding and/or non-breeding season, were apportioned to SPAs.

Species	Breeding season mortality apportioned to SPAs (Yes/No)	Non-breeding season mortality apportioned to SPAs (Yes/No)
Arctic tern	No[1]	Yes
Common tern	No[1]	Yes
Kittiwake	Yes	Yes
Great black-backed gull	No[1]	Yes
Guillemot	Yes	Yes
Razorbill	Yes	Yes
Puffin	Yes	Yes

Species	Breeding season mortality apportioned to SPAs (Yes/No)	Non-breeding season mortality apportioned to SPAs (Yes/No)
Fulmar	Yes	Yes
Gannet	Yes	Yes

[1] No SPAs with this species as a qualifying feature or named component of a seabird assemblage within foraging range of the WDA

2.2 Breeding season apportioning rates

12. For the breeding season, the apportioning weighting assigned to each SPA population was calculated using the NatureScot's advice note: Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs[2] using the breeding apportioning spreadsheet available in NatureScot's interim guidance[3]. NatureScot advised in their response to the Scoping Report that '*The distance between the geometric centre of the WDA and the geometric centre of the SPA should be used for the purposes of apportioning*' (22 November 2024).

13. This method calculates SPA apportionment weights as a function of distance (shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of an SPA), SPA population size (most recent count of numbers of breeding adults) and the proportion of the area within foraging range around the SPA which is sea (NatureScot Interim Guidance[2]). Absolute SPA weight was then converted to relative weight by dividing absolute weight for each SPA by the sum of absolute weights for all SPAs and non-SPAs:

    - SPA breeding season apportioning weight = [SPA count / sum (all SPA and non-SPA counts)] x [(sum of all SPA and non-SPA distances^2) / SPA distance^2] x [(1 / SPA proportional sea area) / (sum (1/all SPA and non-SPA proportional areas))]

14. The information for calculating each SPA's breeding season apportioning weighting was obtained as described below.

2.2.1 SPA and non-SPA colonies to which impacts were apportioned

15. Breeding season mortality from the Project was apportioned to colonies with an SPA classification as well as to non-SPA colonies.

16. For the breeding season, the list of SPAs and non-SPA colonies to which impacts needed to be apportioned was defined by theoretical connectivity with the WDA (refer to **Section 2.2.2**). All SPA and non-SPA colonies were selected on the basis of species-specific breeding season foraging ranges, using the mean maximum range plus one standard deviation, as advised by NatureScot in their online Guidance Note 3[4] (**Table 2**).

17. For each species, a list of all SPA and non-SPA colonies within foraging range from the geometric centre of the WDA is provided in a species-specific table under the heading of '**Breeding season apportioning**' in **Section 4.0**. For each species included in the assessment (**Section 2.1**), SPA colonies included those which have that species as a qualifying feature and/or a named component of any seabird assemblage feature.

[2] NatureScot Interim Guidance: Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs | NatureScot

[3] NatureScot breeding season apportioning spreadsheet: 2016 12 21 - Example spreadsheet for Apportioning Guidance - updated 2017 (A2623934).xlsx

[4] NatureScot Guidance Note Number 3 (Version 1: January 2023): Guidance Note 3: Guidance to support Offshore Wind applications: Marine Birds - Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges | NatureScot

Table 2: Breeding season foraging ranges from NatureScot Guidance Note 3. MM = mean of the maximum foraging range. Max = maximum foraging range. SD = standard deviation.

Species	NatureScot recommended Foraging Range (km)	Metric
Arctic tern	40.5	MM+SD
Common tern	26.9	MM+SD
Fulmar	1200.2	MM+SD
Gannet	509.4	MM+SD
Gannet (Forth Islands SPA)	590.0	Max
Gannet (Grassholm SPA)	516.7	Max
Gannet (St Kilda SPA)	709.0	Max
Great black-backed gull	73.0	Max/MM
Guillemot (for all colonies except those in the Northern Isles)	95.2	MM+SD
Guillemot (all Northern Isles colonies)	153.7	MM+SD
Herring gull	85.6	MM+SD
Kittiwake	300.6	MM+SD
Razorbill (all colonies except those in the Northern Isles)	122.2	MM+SD
Razorbill (all Northern Isles colonies)	164.6	MM+SD
Puffin	265.4	MM+SD

2.2.2 Distance estimates from WDA to SPA or non-SPA colonies

18. To apportion breeding season mortality, the distance of each colony from the Project was measured as the distance between the geometric centre of the WDA to the geometric centre of the colony, as recommended in NatureScot's Interim Guidance on apportioning[2] and in NatureScot's response to the Scoping Report (22 November 2024). Note, this is a different approach to establishing connectivity between the Project and SPAs for HRA Screening, where NatureScot advised in response to the Scoping Report to use the shortest distance between the boundary of the SPA and boundary of the WDA. As a consequence of using a different approach to establishing connectivity at the HRA Screening stage and the apportioning stage of the impact assessment process, some SPAs for some species were initially screened into the assessment but subsequently had no mortality apportioned to them.

19. Also recommended in NatureScot's Interim Guidance on apportioning[2], distances between each colony and the centre of the WDA were measured as the shortest 'at-sea' distance, rather than straight line distances. Most seabirds rarely fly over land and so a representative distance for a bird flying from a colony would be a route that follows the coastline. All

distances were measured in the Geographical Information Systems (GIS) programme ESRI ArcGIS Pro 3.4.3[5].

2.2.3 Breeding SPA population sizes

20. **Annex 11.2M: Regional Breeding Adult Population Estimates** provides breeding seabird population estimates that includes all SPA and non-SPA colonies within foraging range from the WDA. In summary, adult breeding colony counts were selected from the JNCC Seabirds Count datasets[6] (refer to Burnell et al*.,* 2023) and Seabird Monitoring Programme (SMP) database[7] (counts were only selected from the SMP database if the count was an update to the count presented in Burnell et al*.,* 2023). Breeding colonies (both SPA and non-SPA) to which breeding mortality was apportioned, were selected if their geometric centre was within an 'at-sea' recommended species-specific foraging range from the geometric centre of the WDA. Reported counts for each colony were adjusted to provide the number of individual breeding adults, using the following methods:

- Gannet, kittiwake, great black-backed gull and fulmar: Apparently Occupied Nest (AON) or Apparently Occupied Site (AOS) * 2 = individuals;
- Guillemot: Individuals (IND) * 0.67 to give the estimated number of pairs, then * 2 = individuals;
- Razorbill: Individuals (IND) * 0.75 to give the estimated number of pairs, then * 2 = individuals (as advised by NatureScot at the Expert Topic Group meeting 4 (ETG 4, 2 December 2025); and,
- Puffin Apparently Occupied Burrows (AOB) * 2 = individuals.

2.2.4 Proportion of area which is sea

21. As recommended in NatureScot's Interim Guidance on apportioning[2], the 'proportion of area that is sea' was calculated using GIS, with the total area around a breeding colony defined by the foraging range for each species (**Table 2**) from which the relative proportions of land and sea were derived.

2.3 Non-breeding season apportioning rates

22. Non-breeding season mortality from the Project was apportioned to SPAs within the relevant species-specific Biologically Defined Minimum Population Scale (BDMPS) region (Furness, 2015). The relevant BDMPS region was the one in which the Project sits. **Table 3** names the BDMPS region that is relevant for each species for which non-breeding season mortality was apportioned.

Table 3: Biologically Defined Minimum Population Scale (BDMPS, Furness, 2015) regions that are relevant for each species.

BDMPS Region Name	Species included in BDMPS region
UK Western waters & Channel	Kittiwake; Fulmar
UK West of Scotland waters	Great black-backed gull
UK Western waters	Gannet; Common tern; Arctic tern; Guillemot; Razorbill; Puffin

[5] ESRA ArcGIS Pro 3.4.3: Desktop GIS Software | Mapping Analytics | ArcGIS Pro

[6] Seabirds Count Datasets 2023 updated July 2024: Seabirds Count Datasets | JNCC Resource Hub

[7] Seabird Monitoring Programme (SMP) Database: Seabird Monitoring Programme | JNCC

23. The Furness (2015) BDMPS report includes 'Appendix A' which lists all SPAs contributing to a particular BDMPS for each species in each season (i.e. spring migration, autumn migration and winter) and the estimated number of adults and immatures that are contributed.

24. Therefore, the non-breeding season apportioning weightings were calculated for each SPA located within each species-specific western BDMPS. Apportioning rates were calculated as the proportion of adults that the SPA contributes to the BDMPS population in that season as follows:

    1. Each BDMPS SPA population was multiplied by the proportion of adults that the SPA contributes to the BDMPS (both numbers are available in Appendix A, Furness, 2015) to give the absolute number of adults that SPA contributes to the BDMPS.
    2. This value was then divided by the BDMPS population size (of all aged individuals) to give the proportional contribution of adults to the BDMPS from that SPA. This was taken as the apportionment weighting for each SPA.

25. Therefore, the non-breeding tables in **Section 4.0** which present non-breeding season apportionment weightings for each species were calculated as:

    - SPA non-breeding season apportionment = ([SPA count (adults)] * [SPA adult non-breeding proportion in BDMPS]) / [BDMPS population]

26. While the SPA population sizes provided in the Furness (2015) report are now somewhat out of date, using these SPA population sizes, rather than more recent SPA population counts (e.g. Burnell et al., 2023), this approach assumes that the relative contributions each SPA makes to the BDMPS will have remained largely unchanged, despite changes in absolute population sizes over time.

2.3.1 Non-breeding season apportioning weighting for guillemot

27. An exception to the non-breeding season apportioning method was common guillemot. NatureScot advised in their response to the Scoping Report (22 November 2024) that as guillemots largely remain in the vicinity of their breeding colony in the non-breeding season, the non-breeding season BDMPS for guillemot comprises the breeding population found within the mean max foraging range plus 1 SD (as defined in **Table 2**, NatureScot Guidance Note 3[4]).

28. To calculate a BDMPS apportioning weight for guillemot, SPA and non-SPA populations (refer to **Section 2.2.3** and **Annex 11.2M: Regional Breeding Adult Population Estimates**) within foraging range were summed, and each SPA divided by this total to obtain the apportioning rate for each.

2.4 Apportioning WDA-alone mortality to SPAs

2.4.1 Removing immature and sabbatical birds from breeding mortality estimates

29. Collision and/or displacement mortality estimated for the WDA-alone was calculated using density of flying birds in the WDA for collision mortality calculations (refer to **Technical Appendix 11.3: Collision Risk Modelling**) or abundance estimates in the WDA plus 2 km buffer for displacement mortality calculations (including an upper and lower displacement mortality rate scenario, **Technical Appendix 11.4: Displacement**). Birds present in the breeding season using the WDA will include immature birds which have yet to start breeding at any particular SPA, as well as sabbatical birds, i.e. adults that are electing to take a year off breeding and so aren't associated with the SPA in that particular year. When apportioning mortality estimated in the breeding season from the WDA to an SPA (using breeding season apportioning rates, refer to **Section 2.2**), it is necessary to estimate the breeding adult

proportion of the mortality to ensure both the mortality and the population against which it was assessed are in the same demographic units (i.e. breeding adults).

30. **Table 4** presents sabbatical rates and the estimated adult proportion of the populations of each species, used to determine the proportion of total estimated WDA-alone mortality that was likely to be sabbatical and immature birds. Sabbatical rates presented are those agreed with NatureScot for a recent offshore windfarm development application (West of Orkney Offshore Windfarm[8]). Adult proportions are taken from the BDMPS report (Furness, 2015) where they are derived from an estimate of the adult component of seabird populations using a stable age structure from a species-specific PVA. NatureScot confirmed that they were content for the assessment to be based on stable age structures, at the Expert Topic Group meeting 4 (ETG 4, 2 December 2025).

Table 4: Sabbatical rates and adult proportion of the population, used for removing the immature and sabbatical component from estimated mortalities.

Species	Sabbatical rate	Adult proportion
Arctic tern	0	0.63
Common tern	0	0.6
Kittiwake	0.1	0.53
Great black-backed gull	0.35	0.44
Guillemot	0.07	0.57
Razorbill	0.07	0.57
Puffin	0.07	0.55
Fulmar	0	0.62
Gannet	0.1	0.55

31. Breeding season mortalities estimated for the WDA-alone were first multiplied by the adult proportion (**Table 4**) to estimate the number of adult mortalities occurring within the WDA (plus 2 km buffer for displacement). This was then multiplied by [1-sabbatical rate] to obtain the number of mortalities that were adult breeding birds.

32. Since the non-breeding season SPA apportioning rates are calculated as SPA breeding adults divided by the BDMPS population (which included all age classes) these rates are already in the appropriate demographic units (breeding adults) and no further adjustment is required and the non-breeding season apportioning rate can simply be multiplied by the total non-breeding mortality to obtain the portion of the mortality to be assigned to each SPA (**Section 2.3**).

2.4.2 Apportioning breeding and non-breeding mortality to SPAs

33. Collision and displacement mortalities (including lower and upper displacement scenario mortality), with sabbatical and immature birds removed (**Section 2.4.1**), were apportioned to SPAs using the calculated species-specific breeding and non-breeding season (i.e. spring migration, autumn migration and winter season) apportioning weightings (**Section 2.2** and **Section 2.3** respectively).

34. Apportioning impacts is a simple process of multiplying estimated mortality for a particular season by the appropriate seasonal apportioning weighting for that SPA. For SPAs which

[8] Offshore Environmental Impact Assessment Report - Additional Information - West of Orkney Windfarm - West of Hoy, Orkney | marine.gov.scot

could not be screened out at the HRA screening stage, estimated Project collision and/or displacement mortality was multiplied by the breeding or non-breeding apportioning weighting respectively. The collision and/or displacement mortality was apportioned separately, providing an estimate of collision and/or displacement mortality for each season for each SPA.

2.4.1 Calculating total seasonal and annual mortality at SPAs

35. Seasonal mortality at each SPA was calculated by summing all collision and lower/upper displacement mortality from the Project in a particular season. For example, total kittiwake breeding season mortality apportioned to an SPA was calculated as apportioned collision mortality plus lower displacement mortality as well as apportioned collision mortality plus upper displacement mortality. The same additions were carried out for kittiwake spring and autumn mortality apportioned to an SPA.

36. Annual mortality was calculated by adding breeding and non-breeding season mortality together. For example, total kittiwake annual mortality at an SPA was calculated as breeding, spring and autumn season collision plus lower displacement mortality as well as breeding, spring and autumn season collision plus upper displacement mortality. Annual mortality was used to calculate the increase in annual mortality rate which is used in the PVAs.

2.5 In-combination mortality apportioned to SPAs

37. Estimated collision and displacement mortality apportioned from other offshore windfarms (i.e. in-combination offshore windfarms) to the same SPAs impacted by the Project within each species-specific Western BDMPS region (**Table 3**) are presented in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.

38. For the HRA impact assessment process, apportioned adult mortality estimates from other offshore windfarms were added to the apportioned WDA-alone mortality to assess in-combination impacts on the SPA population.

3.0 Calculating change in baseline adult mortality rates and PVA requirements

3.1 Estimating change in baseline adult mortality rate

39. The change in baseline annual adult mortality rate was calculated for each SPA population by dividing the total annual mortality (collision plus displacement mortality from the WDA-alone and in-combination) by the size of the SPA population (in the units of individual adults) and then multiplying by 100 to give the percentage point change in annual mortality rate.

3.2 Thresholds for Determining Whether a PVA is Required

40. The final step of an HRA impact assessment process is to assess how an SPA population will respond to the predicted additional offshore windfarm mortality from the WDA-alone and in-combination with other offshore windfarms (if an in-combination assessment is required, **Section 2.5**). This is done using population models, also known as Population Viability Analysis (PVA).

41. When predicted offshore windfarm mortalities are very small, relative to the SPA population size, it is not necessary to run a PVA as that PVA would show population trajectories in the presence of offshore windfarm mortality that are indistinguishable from baseline trajectories (i.e. in the absence of offshore windfarm mortality).

42. NatureScot advise using a threshold of a 0.02 percentage point change in adult annual mortality rate to determine when a PVA is required (NatureScot Guidance Note 11[9]), i.e. when the change in adult annual mortality rate is equal to or greater than 0.02%, a PVA should be run to assess population response to predicted impacts.

43. Following NatureScot Guidance Note 11[9] and NatureScot advice in their response to the Scoping Report (22 November 2024), an in-combination assessment is only required to assess a designated seabird species at an SPA when WDA-alone mortality is greater than 0.2 birds (refer to NatureScot guidance note box in **Section 3.2**).

44. This consideration of whether a PVA is needed, is required for both WDA-alone impacts and in-combination impacts. NatureScot provided the following advice (refer to the **Text Box A** below) in their response to the Scoping Report (22 November 2024), regarding how to identify the requirement for a PVA.

45. This NatureScot advice on when to undertake a PVA for WDA-alone and in-combination impacts was applied to the changes in annual adult mortality rates. Tables under the heading of 'Change in baseline mortality rate and PVA requirements' in the species-specific sections in **Section 4.0** of this report indicate which SPA populations require a PVA, for either WDA-alone and/or in-combination mortalities.

[9] NatureScot Guidance Note 11 (version 1, January 2023): https://www.nature.scot/doc/guidance-note-11-guidance-support-offshore-wind-applications-marine-ornithology-recommendations

Text Box A:

Identifying the requirement for PVA – NatureScot Guidance Update

Within both EIA and HRA, the predicted impacts of offshore wind developments need to be considered against relevant marine bird populations. The primary method used for assessing the population consequences in these assessments is PVA.

Our advice on the requirement for PVA is as follows:

Proposal alone impacts

• PVAs will be required for all sites and species where the proposal alone impacts equal or exceed a 0.02 percentage point change in combined breeding and non-breeding season adult survival rate (i.e. a ≥0.02 percentage point decrease in survival rate or a ≥ 0.02 percentage point increase in mortality rate).

• This could apply to any level of proposal alone mortality, though in reality it is unlikely that a very low proposal alone mortality will meet this threshold. However, annual adult mortality and changes in adult survival rate values should be presented for all sites and species, thereby providing clarity on when PVA is required.

In-combination impacts

• PVAs will generally be required for all sites and species where the in-combination impacts equal or exceed a 0.02 percentage point change in combined breeding and non-breeding season adult survival rate. (i.e. a ≥0.02 percentage point decrease in survival rate or a ≥ 0.02 percentage point increase in mortality rate).

• The exception to this is where the proposal contribution to the in-combination impact is less than 0.2 birds per annum. In this case the impact from the individual proposal is deemed to not make a tangible contribution to the in-combination impacts and therefore a PVA is not required.

• Where the proposal contribution is less than 0.2 birds per annum, a table should be provided that details by site and species the percentage point changes in adult survival rate and the number of birds impacted per annum. This is to allow for this data to be used in future in-combination assessments for other developments, where necessary.

The threshold of 0.02 percentage point decrease in adult annual survival rate applies to both EIA and HRA assessments.

4.0 Results

4.1 Arctic tern

46. Arctic tern SPA proportional apportioning rates for Anglesey Terns / Morwenoliaid Ynys Môn SPA, Outer Ards SPA and Strangford Lough SPA calculated for the Project in the non-breeding season are presented in **Table 5**. Mortality was not apportioned to SPAs during the breeding season as there are no SPAs with breeding Arctic tern as a qualifying feature within foraging range.

47. For the WDA-alone**, Table 6** presents apportioned non-breeding season collision mortality, lower displacement mortality (30% displacement and 3% mortality) and upper displacement mortality (50% displacement and 3% mortality) as well as total annual combined mortality for collision plus lower displacement and collision plus upper displacement. Project apportioned annual mortality was greatest for Arctic tern populations at Anglesey Terns / Morwenoliaid Ynys Môn SPA.

48. **Table 7** presents the following:

- Most recent SPA population size of adult individuals (from Burnell et al., 2023);
- Apportioned annual collision plus lower/upper displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds); and,
- Identifies that no in-combination PVA is required for Arctic tern.

49. For the WDA-alone, change in annual adult mortality rate was very low for all three SPAs, (all <0.01% for both lower and upper displacement scenarios). WDA-alone mortality did not exceed the threshold of 0.2 birds per annum for any SPA, meaning no in-combination PVA was required.

4.1.1 Non-breeding season apportioning

Table 5: Arctic tern autumn and spring apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Non-breeding proportion of adults from SPA	Non-breeding apportioning rate[1]
Anglesey Terns / Morwenoliaid Ynys Môn SPA	1100	1	0.01541
Outer Ards SPA	120	1	0.00168
Strangford Lough SPA	328	1	0.00459
BDMPS Autumn & Spring migration (Furness, 2015; individual adults and immatures)	**71,398**	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.1.2 Apportioned mortality

Table 6. Arctic tern WDA-alone apportioned collision and displacement mortality.

Collision and displacement mortality (refer to Technical Appendix 11.3: Collision Risk Modelling and Technical Appendix 11.4: Displacement respectively) was apportioned to SPAs using apportioning rates presented in Table 5.

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (30% x 3%)				Upper Displacement (50% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
Anglesey Terns / Morwenoliaid Ynys Môn SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.005	0.012	0.02	0	0.008	0.022	0.03	0.02	0.03
Outer Ards SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.001	0.001	<0.01	0	0.001	0.002	<0.01	0.01	0.01
Strangford Lough SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.001	0.004	0.01	0	0.002	0.006	0.01	0.01	0.01

4.1.3 Change in baseline mortality rate and PVA requirements

Table 7: Arctic tern WDA-alone summed collision plus lower displacement (30% x 3%) or upper displacement mortality (50% x 3%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Population size is number of adult individuals from Burnell et al., (2023).

SPA	Population size (adult individuals)	WDA-alone				PVA required?		
		Collision plus Lower Displacement		Collision plus Upper Displacement				
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Anglesey Terns / Morwenoliaid Ynys Môn SPA	3978	0.02	<0.01	0.03	<0.01	No	No	No
Outer Ards SPA	431	0.01	<0.01	0.01	<0.01	No	No	No
Strangford Lough SPA	173	0.01	<0.01	0.01	<0.01	No	No	No

4.2 Common tern

50. Common tern SPA proportional apportioning rates calculated for the Project at eight SPAs in the non-breeding season are presented in **Table 8**. Mortality was not apportioned to SPAs during the breeding season as there are no SPAs with breeding common tern qualifying features within foraging range.

51. For the WDA-alone**, Table 9** presents apportioned non-breeding season collision mortality, lower displacement mortality (30% displacement and 3% mortality) and upper displacement mortality (50% displacement and 3% mortality) as well as total annual combined mortality for collision plus lower displacement and collision plus upper displacement. Project apportioned annual mortality was very low at all SPAs (<= 0.1 bird).

52. **Table 10** presents the following:

- Most recent SPA population size of adult individuals (from Burnell et al*.,* 2023);
- Apportioned annual collision plus lower/upper displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds); and,
- Identifies that no in-combination PVA is required for common tern.

53. For the WDA-alone, change in annual adult mortality rate was very low for all eight SPAs, (all <0.01% for both lower and upper displacement scenarios). WDA-alone mortality did not exceed the threshold of 0.2 birds per annum for any SPA, meaning no in-combination PVA was required.

4.2.1 Non-breeding season apportioning

Table 8: Common tern autumn and spring apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A.

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Non-breeding proportion of adults from SPA	Non-breeding apportioning rate[1]
Anglesey Terns / Morwenoliaid Ynys Môn SPA	356	0.9	0.00496
Carlingford Lough SPA	238	0.9	0.00331
Glas Eileanan SPA	44	0.9	0.00061
Larne Lough SPA	462	0.9	0.00643
Lough Neagh & Lough Beg SPA	156	0.9	0.00217
Ribble & Alt Estuaries SPA	222	0.9	0.00309
Strangford Lough SPA	704	0.9	0.00980
The Dee Estuary SPA	330	0.9	0.00459
BDMPS Autumn & Spring migration (Furness, 2015; individual adults and immatures)	**64,659**	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.2.2 Apportioned mortality

Table 9: Common tern WDA-alone apportioned collision and displacement mortality.

Collision and displacement mortality (refer to Technical Appendix 11.3: Collision Risk Modelling and Technical Appendix 11.4: Displacement respectively) was apportioned to SPAs using apportioning rates presented in Table 8.

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (30% x 3%)				Upper Displacement (50% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
Anglesey Terns / Morwenoliaid Ynys Môn SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.003	0	<0.01	0	0.004	0	<0.01	<0.01	<0.01
Carlingford Lough SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.002	0	<0.01	0	0.003	0	<0.01	<0.01	<0.01
Glas Eileanan SPA	No	Yes	0	<0.001	<0.001	<0.01	0	<0.001	0	<0.01	0	0.001	0	<0.01	<0.01	<0.01
Larne Lough SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.004	0	<0.01	0	0.006	0	0.01	<0.01	0.01
Lough Neagh & Lough Beg SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.001	0	<0.01	0	0.002	0	<0.01	<0.01	<0.01
Ribble & Alt Estuaries SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.002	0	<0.01	0	0.003	0	<0.01	<0.01	<0.01

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (30% x 3%)				Upper Displacement (50% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
Strangford Lough SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.006	0	0.01	0	0.009	0	0.01	0.01	0.01
The Dee Estuary SPA	No	Yes	0	<0.001	<0.001	<0.01	0	0.003	0	<0.01	0	0.004	0	<0.01	<0.01	<0.01

4.2.3 Change in baseline mortality rate and PVA requirements

Table 10: Common tern WDA-alone summed collision plus lower displacement (30% x 3%) or upper displacement mortality (50% x 3%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Population size is number of adult individuals from Burnell et al., (2023), unless otherwise specified.

SPA	Population size (adult individuals)	WDA-alone				PVA required?		
		Collision plus Lower Displacement		Collision plus Upper Displacement				
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Anglesey Terns / Morwenoliaid Ynys Môn SPA	974	<0.01	<0.01	<0.01	<0.01	No	No	No
Carlingford Lough SPA	246	<0.01	<0.01	<0.01	<0.01	No	No	No
Glas Eileanan SPA	110	<0.01	<0.01	<0.01	<0.01	No	No	No
Larne Lough SPA	666	<0.01	<0.01	0.01	<0.01	No	No	No
Lough Neagh & Lough Beg SPA	476	<0.01	<0.01	<0.01	<0.01	No	No	No
Ribble & Alt Estuaries SPA[1]	12	<0.01	0.02	<0.01	0.02	No	No	No
Strangford Lough SPA	914	0.01	<0.01	0.01	<0.01	No	No	No
The Dee Estuary SPA[2]	0	<0.01	0	<0.01	0	No	No	No

[1] Although change to baseline mortality is 0.023% for WDA-alone, with a population size of 12 adult individuals, it is not possible to run a PVA for Ribble and Alt Estuaries SPA.
[2] Colony counts recorded as adult pairs (Apparently Occupied Nests, AON) were selected from the Seabird Monitoring Programme database[7].

4.3 Kittiwake

54. Kittiwake SPA proportional apportioning rates calculated for the Project are presented for the breeding season in **Table 11** and the non-breeding season in **Table 12**.

55. For the WDA-alone**, Table 13** summarises whether kittiwake mortality was apportioned from the breeding and/or the non-breeding season(s) to SPAs and it also presents apportioned seasonal collision mortality, lower displacement mortality (30% displacement and 1% mortality) and upper displacement mortality (30% displacement and 3% mortality). A total annual combined mortality for collision plus lower displacement and collision plus upper displacement for the WDA-alone is also presented. Project apportioned annual mortality was greatest for kittiwake populations at North Colonsay and Western Cliffs SPA followed by Rathlin Island SPA.

56. Details of seasonal and annual collision and displacement mortalities apportioned from other offshore windfarms to the same SPAs impacted by the Project are presented for the in-combination assessment in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**. NatureScot advise that displacement impacts should be considered for kittiwake (NatureScot Guidance Note 8) whereas Natural England advise that kittiwake displacement do not need to be included in impact assessments (Parker et al., 2022). Therefore, displacement was only considered for offshore windfarms in Scotland.

57. **Table 14** (lower displacement impact scenario) and **Table 15** (upper displacement impact scenario) presents the following:

    - Most recent SPA population size of adult individuals (from Burnell et al., 2023 or SMP database[7], when updated counts were available);
    - Apportioned annual collision plus displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
    - Apportioned annual collision plus displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms (in-combination mortality is presented only if an SPA requires an in-combination PVA); and,
    - Identifies which SPA populations required a PVA for the WDA-alone impacts (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

58. For the WDA-alone, change in annual adult mortality rate was greatest at North Colonsay and Western Cliffs SPA followed by Cape Wrath SPA, Rathlin Island SPA, Ailsa Craig SPA, Flannan Isles SPA, Mingulay and Berneray SPA, North Rona and Sula Sgeir SPA, Rum SPA, Canna and Sanday SPA and St Kilda SPA (all >=0.02% for the upper displacement scenario). WDA-alone mortality exceeded the PVA threshold of 0.02% at these ten SPAs.

59. For all in-combination offshore windfarms, change in annual adult mortality rate was greatest at Ailsa Craig SPA followed by Cape Wrath SPA, North Colonsay and Western Cliffs SPA, Rathlin Island SPA, Flannan Isles SPA, Mingulay and Berneray SPA, North Rona and Sula Sgeir SPA, Rum SPA, Canna and Sanday SPA, and Handa SPA (all >=0.02% for the upper displacement scenario). In-combination mortality exceeded the PVA thresholds of >= 0.02% change in baseline mortality rate for in-combination offshore windfarms and WDA-alone annual mortality >=0.2 birds at these ten SPAs. No mortality data is available from other offshore windfarms to add to the in-combination assessment at Horn Head to Fanad Head SPA or St Kilda SPA.

60. PVA model inputs and outputs for these SPAs are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**.

4.3.1 Breeding season apportioning

Table 11: Kittiwake breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding kittiwake as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
Ailsa Craig SPA	824	144.7	20938.1	0.474	2.111	0.02605	0.00357
Aughris Head SPA	1110	249.2	62088.4	0.678	1.475	0.00827	0.00113
Canna and Sanday SPA	2956	116.8	13642.2	0.681	1.469	0.09983	0.01367
Flannan Isles SPA	1632	260.0	67583.7	0.847	1.181	0.00894	0.00122
Handa SPA	9178	293.6	86222.9	0.789	1.267	0.04229	0.00579
Horn Head to Fanad Head SPA	3640	125.8	14467.0	0.643	1.554	0.12262	0.01679
Mingulay and Berneray SPA	4088	105.0	11028.1	0.709	1.410	0.16385	0.02243
North Colonsay and Western Cliffs SPA	9852	38.9	1513.2	0.576	1.735	3.54191	0.48492
Rathlin Island SPA	19258	89.1	7938.8	0.509	1.965	1.49422	0.20457
Rum SPA	1640	110.6	12232.3	0.671	1.490	0.06264	0.00858
Shiant Isles SPA	2318	214.2	45890.9	0.776	1.289	0.02042	0.00280
St Kilda SPA	1658	232.0	53808.5	0.873	1.146	0.01107	0.00152

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
West Donegal Coast SPA	1322	201.0	40401.0	0.682	1.467	0.01505	0.00206
Other colonies within foraging range of the WDA[2]						1.68690	0.23095
Sum	**86106**		**5528493.1**		**204.783**	**7.30406**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.3.2 Non-breeding season apportioning

Table 12: Kittiwake autumn and spring apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Autumn proportion of adults from SPA	Autumn apportioning rate[1]	Spring proportion of adults from SPA	Spring apportioning rate[1]
Ailsa Craig SPA	978	0.6	0.00064	0.8	0.00113
Canna and Sanday SPA	1640	0.6	0.00108	0.8	0.00190
Cape Wrath SPA	20688	0.6	0.01362	0.8	0.02393
Flannan Isles SPA	2784	0.6	0.00183	0.8	0.00322
Handa SPA	3744	0.6	0.00246	0.8	0.00433
Mingulay and Berneray SPA	4456	0.6	0.00293	0.8	0.00515
North Colonsay & Western Cliffs SPA	11126	0.6	0.00732	0.8	0.01287
North Rona & Sula Sgeir SPA	2506	0.6	0.00165	0.8	0.00290
Rathlin Island SPA	15844	0.6	0.01043	0.8	0.01833
Rum SPA	1576	0.6	0.00104	0.8	0.00182
Shiant Isles SPA	1098	0.6	0.00072	0.8	0.00127
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	2090	0.6	0.00138	0.8	0.00242
St Kilda SPA	1914	0.6	0.00126	0.8	0.00221
BDMPS Autumn (Furness, 2015; individual adults and immatures)	**911,586**	N/A	N/A	N/A	N/A
BDMPS Spring (Furness, 2015; individual adults and immatures)	**691,526**	N/A	N/A	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.3.3 Apportioned mortality

Table 13: Kittiwake WDA-alone apportioned collision and displacement mortality.

Collision and displacement mortality (refer to Technical Appendix 11.3: Collision Risk Modelling and Technical Appendix 11.4: Displacement respectively) was apportioned to SPAs using apportioning rates for the breeding season (Table 11) and non-breeding season (Table 12).

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (30% x 1%)				Upper Displacement (30% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
Ailsa Craig SPA	Yes	Yes	0.083	0.06	0.04	0.180	0.006	0.01	0.01	0.03	0.019	0.03	0.04	0.09	0.21	0.27
Aughris Head SPA	Yes	No	0.026	0	0	0.026	0.002	0	0	<0.01	0.006	0	0	0.01	0.03	0.03
Canna and Sanday SPA	Yes	Yes	0.318	0.09	0.07	0.481	0.024	0.02	0.02	0.06	0.072	0.05	0.06	0.19	0.54	0.67
Cape Wrath SPA	No	Yes	0	1.18	0.87	2.06	0	0.23	0.25	0.48	0	0.69	0.75	1.44	2.54	3.50
Flannan Isles SPA	Yes	Yes	0.028	0.16	0.12	0.305	0.002	0.03	0.03	0.07	0.006	0.09	0.10	0.20	0.37	0.51
Handa SPA	Yes	Yes	0.135	0.21	0.16	0.507	0.010	0.04	0.05	0.10	0.030	0.13	0.14	0.29	0.60	0.80
Horn Head to Fanad Head SPA	Yes	No	0.390	0	0	0.390	0.030	0	0	0.03	0.088	0	0	0.09	0.42	0.48
Mingulay and Berneray SPA	Yes	Yes	0.521	0.25	0.19	0.964	0.040	0.05	0.05	0.14	0.118	0.15	0.16	0.43	1.11	1.39
North Colonsay and Western Cliffs SPA	Yes	Yes	11.267	0.64	0.47	12.373	0.856	0.12	0.14	1.12	2.544	0.37	0.40	3.32	13.49	15.69

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (30% x 1%)				Upper Displacement (30% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
North Rona and Sula Sgeir SPA	No	Yes	0	0.14	0.11	0.25	0	0.03	0.03	0.06	0	0.08	0.09	0.17	0.31	0.42
Rathlin Island SPA	Yes	Yes	4.753	0.91	0.67	6.328	0.361	0.18	0.19	0.73	1.073	0.53	0.58	2.18	7.06	8.51
Rum SPA	Yes	Yes	0.199	0.09	0.07	0.356	0.015	0.02	0.02	0.05	0.045	0.05	0.06	0.16	0.41	0.51
Shiant Isles SPA	Yes	Yes	0.065	0.06	0.05	0.174	0.005	0.01	0.01	0.03	0.015	0.04	0.04	0.09	0.20	0.27
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	No	Yes	0	0.12	0.09	0.21	0	0.02	0.03	0.05	0	0.07	0.08	0.15	0.26	0.35
St Kilda SPA	Yes	Yes	0.035	0.11	0.08	0.225	0.003	0.02	0.02	0.05	0.008	0.06	0.07	0.14	0.27	0.37
West Donegal Coast SPA	Yes	No	0.048	0	0	0.048	0.004	0	0	<0.01	0.011	0	0	0.01	0.05	0.06

4.3.4 Change in baseline mortality rate and PVA requirements

Table 14: Kittiwake WDA-alone and in-combination summed collision plus LOWER displacement (30% x 1%), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme where updated counts are available.

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Ailsa Craig SPA	824	0.21	0.03	2.37	0.29	Yes	Yes	Yes
Aughris Head SPA	1110	0.03	<0.01	N/A	N/A	No	No	No
Canna and Sanday SPA	2956	0.54	0.02	0.56	0.02	Yes	Yes	Yes
Cape Wrath SPA	6460	2.54	0.04	9.9	0.15	Yes	Yes	Yes
Flannan Isles SPA	1632	0.37	0.02	0.38	0.02	Yes	Yes	Yes
Handa SPA	9178	0.60	0.01	1.1	0.01	No	Yes	No
Horn Head to Fanad Head SPA[1]	3640	0.42	0.01	N/A	N/A	No	N/A	N/A
Mingulay and Berneray SPA	4088	1.11	0.03	1.12	0.03	Yes	Yes	Yes
North Colonsay and Western Cliffs SPA	9852	13.49	0.14	14.17	0.14	Yes	Yes	Yes
North Rona and Sula Sgeir SPA	1424	0.31	0.02	0.35	0.02	Yes	Yes	Yes
Rathlin Island SPA	19258	7.06	0.04	8.12	0.04	Yes	Yes	Yes
Rum SPA	1640	0.41	0.02	0.42	0.03	Yes	Yes	Yes
Shiant Isles SPA	2318	0.20	0.01	0.23	0.01	No	Yes	No
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	2878	0.26	0.01	0.33	0.01	No	Yes	No
St Kilda SPA[1]	1658	0.27	0.02	N/A	N/A	Yes	N/A	N/A

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
West Donegal Coast SPA	1322	0.05	<0.01	N/A	N/A	No	No	No

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Horn Head to Fanad Head SPA or St Kilda SPA

Table 15: Kittiwake WDA-alone and in-combination summed collision plus UPPER displacement (30% x 3%), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme where updated counts are available.

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Ailsa Craig SPA	824	0.27	0.03	2.45	0.30	Yes	Yes	Yes
Aughris Head SPA	1110	0.03	<0.01	N/A	N/A	No	No	No
Canna and Sanday SPA	2956	0.67	0.02	0.69	0.02	Yes	Yes	Yes
Cape Wrath SPA	6460	3.50	0.05	11.6	0.18	Yes	Yes	Yes
Flannan Isles SPA	1632	0.51	0.03	0.53	0.03	Yes	Yes	Yes
Handa SPA	9178	0.80	0.01	1.5	0.02	No	Yes	Yes
Horn Head to Fanad Head SPA[1]	3640	0.48	0.01	N/A	N/A	No	N/A	N/A
Mingulay and Berneray SPA	4088	1.39	0.03	1.41	0.03	Yes	Yes	Yes
North Colonsay and Western Cliffs SPA	9852	15.69	0.16	16.37	0.17	Yes	Yes	Yes

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
North Rona and Sula Sgeir SPA	1424	0.42	0.03	0.48	0.03	Yes	Yes	Yes
Rathlin Island SPA	19258	8.51	0.04	9.57	0.05	Yes	Yes	Yes
Rum SPA	1640	0.511	0.03	0.52	0.03	Yes	Yes	Yes
Shiant Isles SPA	2318	0.27	0.01	0.30	0.01	No	Yes	No
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	2878	0.35	0.01	0.42	0.01	No	Yes	No
St Kilda SPA[1]	1658	0.37	0.02	N/A	N/A	Yes	N/A	N/A
West Donegal Coast SPA	1322	0.06	<0.01	N/A	N/A	No	No	No

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Horn Head to Fanad Head SPA or St Kilda SPA

4.4 Great black-backed gull

61. Great black-backed gull proportional apportioning rates for North Rona & Sula Sgeir SPA calculated for the Project in the non-breeding season is presented in **Table 16**. North Rona & Sula Sgeir SPA is the only SPA which contributes to the great black-backed gull UK West of Scotland waters BDMPS. Mortality was not apportioned to SPAs during the breeding season as there are no SPAs listing breeding great black-backed gull as a designated feature within foraging range.

62. **Table 17** presents non-breeding season collision mortality (annual mortality = 0.01 bird) apportioned to North Rona & Sula Sgeir SPA.

63. **Table 18** presents the following:

- Most recent North Rona & Sula Sgeir SPA population size of adult individuals (from Burnell et al., 2023);
- Apportioned annual collision mortality and change in annual adult mortality rate for the WDA-alone; and,
- Identifies that a PVA is required for the WDA-alone (PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) but an in-combination PVA is not required (PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

64. For the WDA-alone, change in annual adult mortality rate was >=0.02% for North Rona & Sula Sgeir SPA. WDA-alone mortality exceeded the PVA threshold of 0.02% at this SPA. PVA model inputs and outputs for this SPA are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**. .

4.4.1 Non-breeding season apportioning

Table 16: Great black-backed gull non-breeding apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Non-breeding proportion of adults from SPA	Non-breeding apportioning rate[1]
North Rona & Sula Sgeir SPA	382	0.99	0.01100
BDMPS Non-breeding (Furness, 2015; individual adults and immatures)	**34,380**	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.4.2 Apportioned mortality

Table 17: Great black-backed gull WDA-alone apportioned collision mortality.

Collision mortality (refer to Technical Appendix 11.3: Collision Risk Modelling) was apportioned to SPAs using apportioning rates presented in Table 16.

SPA	Seasonal apportioning from the Project		Collisions		
	Breeding	Non-breeding	Breeding	Non-breeding	Annual
North Rona & Sula Sgeir SPA	No	Yes	**0**	**0.07**	**0.07**

4.4.3 Change in baseline mortality rate and PVA requirements

Table 18: Great black-backed gull WDA-alone and in-combination annual collision, resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Population size is number of adult individuals from Burnell et al., (2023).

SPA	Population size	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
North Rona & Sula Sgeir SPA	98	0.07	0.07	N/A	N/A	Yes	No	No

4.5 Guillemot

65. Guillemot proportional apportioning rates calculated for the Project at North Colonsay and Western Cliffs SPA and Rathlin Island SPA are presented for the breeding season in **Table 19** and the non-breeding season in **Table 20**. North Colonsay and Western Cliffs SPA and Rathlin Island SPA are the only two SPAs with breeding guillemot as a qualifying feature within foraging range of the WDA.

66. For the WDA-alone**, Table 21** summarises that guillemot mortality was apportioned from both the breeding and the non-breeding seasons to both SPAs and it also presents apportioned seasonal lower displacement mortality (60% displacement and 3/1% mortality) and upper displacement mortality (60% displacement and 5/3% mortality). Project apportioned annual displacement mortality was greatest for guillemot populations at Rathlin Island SPA.

67. There are no offshore windfarms within foraging range to the same two SPAs impacted by the Project. Therefore, there is no mortality from other offshore windfarms to add to the in-combination assessment at North Colonsay and Western Cliffs SPA or Rathlin Island SPA.

68. **Table 22** (lower displacement impact scenario) and **Table 23** (upper displacement impact scenario) presents the following:

- Most recent SPA population size of adult individuals (from SMP database[7] where updated counts are available for 2023);
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms; and,
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%).

69. For the WDA-alone, change in annual adult mortality rate was greatest at North Colonsay and Western Cliffs SPA followed by Rathlin Island SPA (both SPAs >=0.02% for the upper displacement scenario). WDA-alone mortality exceeded the PVA threshold of 0.2 birds per annum at these two SPAs.

70. PVA model inputs and outputs for these SPAs are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**.

4.5.1 Breeding season apportioning

Table 19: Guillemot breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding guillemot as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
North Colonsay and Western Cliffs SPA	33793	38.9	1513.7	0.664	1.507	0.50442	0.40797
Rathlin Island SPA	152095	89.1	7933.5	0.567	1.764	0.50700	0.41006
Other colonies within foraging range of the WDA[2]						0.22500	0.18198
Sum	**214046**		**151581.4**		**47.236**	**1.23641**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.5.2 Non-breeding season apportioning

Table 20: Guillemot non-breeding apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Yellow highlighted SPAs include breeding guillemot as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Non-breeding proportion of adults from SPA	Non-breeding rate[1]
North Colonsay and Western Cliffs SPA	33793	1	0.15788
Rathlin Island SPA	152095	1	0.71057
BDMPS (individual adults)[2]	**214,046**	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] / sum of SPA adult counts

[2] BDMPS individual adults = sum of all individual breeding colonies within foraging range

4.5.3 Apportioned mortality

Table 21: Guillemot WDA-alone apportioned displacement mortality.

Displacement mortality (refer to Technical Appendix 11.4: Displacement) was apportioned to SPAs using apportioning rates for the breeding season (Table 19) and non-breeding season (Table 20).

SPA	Seasonal apportioning from the Project		Lower Displacement (60% x 3% breeding / 1% non-breeding)			Upper Displacement (60% x 5% breeding / 3% non-breeding)		
	Breeding	Non-breeding	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
North Colonsay and Western Cliffs SPA	Yes	Yes	105.47	15.41	120.88	175.80	46.22	222.02
Rathlin Island SPA	Yes	Yes	106.01	69.34	175.35	176.70	208.02	384.72

4.5.4 Change in baseline mortality rate and PVA requirements

Table 22: Guillemot WDA-alone and in-combination annual LOWER displacement (60% x 3% breeding / 1% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size is from Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality[1]	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
North Colonsay and Western Cliffs SPA	33793	120.88	0.36	N/A	N/A	Yes	N/A	N/A
Rathlin Island SPA	152095	175.35	0.12	N/A	N/A	Yes	N/A	N/A

[1] There are no offshore windfarms within foraging range to add mortality to the in-combination assessment at North Colonsay and Western Cliffs SPA or Rathlin SPA

- **Table 23: Guillemot WDA-alone and in-combination annual UPPER displacement (60% x 5% breeding / 3% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size is from Seabird Monitoring Programme[7] where updated counts are available.**

SPA	Most recent population size (Adult Individuals	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality[1]	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
North Colonsay and Western Cliffs SPA	33793	222.02	0.66	N/A	N/A	Yes	N/A	N/A
Rathlin Island SPA	152095	384.72	0.25	N/A	N/A	Yes	N/A	N/A

[1] There are no offshore windfarms within foraging range to add mortality to the in-combination assessment at North Colonsay and Western Cliffs SPA or Rathlin SPA

4.6 Razorbill

71. Razorbill proportional apportioning rates calculated for the Project at nine SPAs are presented for the breeding season in **Table 24** and the non-breeding season in **Table 25.**

72. For the WDA-alone**, Table 26** summarises whether razorbill mortality was apportioned from the breeding and/or the non-breeding season(s) to SPAs and it also presents apportioned seasonal lower displacement mortality (60% displacement and 3/1% mortality) and upper displacement mortality (60% displacement and 5/3% mortality). Project apportioned annual displacement mortality was greatest for razorbill populations at Rathlin Island SPA followed by Mingulay & Berneray SPA.

73. Details of seasonal and annual collision and displacement mortalities apportioned from other offshore windfarms to the same SPAs impacted by the Project are presented for the in-combination assessment in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.

74. **Table 27** (lower displacement impact scenario) and **Table 28** (upper displacement impact scenario) presents the following:

- Most recent SPA population size of adult individuals (from Burnell et al*.,* 2023 or SMP database[7], when updated counts were available);
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms (in-combination mortality is presented only if an SPA requires an in-combination PVA); and,
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

75. For the WDA-alone, change in annual adult mortality rate was greatest at North Rona and Sula Sgeir SPA, Rathlin Island SPA and Mingulay & Berneray SPA, but change in annual adult mortality rate was >0.02% (for the upper displacement scenario) at all nine SPAs. WDA-alone mortality also exceeded the PVA threshold of 0.2 birds per annum at all nine SPAs.

76. For in-combination offshore windfarms, change in annual adult mortality rate was greatest at North Rona and Sula Sgeir SPA followed by Rathlin Island SPA, Mingulay & Berneray SPA, Skomer, Skokholm and the Seas off Pembrokeshire SPA, Cape Wrath SPA, Handa SPA and Shiant Isles SPA (all >=0.02% for the upper displacement scenario). In-combination mortality exceeded the PVA thresholds of >= 0.02% change in baseline mortality rate for in-combination offshore windfarms and WDA-alone annual mortality >=0.2 birds at these seven SPAs. No mortality data is available from other offshore windfarms to add to the in-combination assessment at Flannan Islands SPA or St Kilda SPA.

77. PVA model inputs and outputs for these SPAs are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**.

4.6.1 Breeding season apportioning

Table 24: Razorbill breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding razorbill as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance[2] (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
Mingulay and Berneray SPA	17718	105.0	11028.1	0.903	1.108	0.10568	0.10515
Rathlin Island SPA	33632	89.1	7933.7	0.516	1.939	0.48802	0.48553
Other colonies within foraging range of the WDA[2]						0.41142	0.40932
Sum	**61548**		**329335.7**		**90.105**	**1.00513**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/ (sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.6.2 Non-breeding season apportioning

Table 25: Razorbill autumn, spring and winter apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Autumn and spring proportion of adults from SPA	Autumn and spring apportioning rate[1]	Winter proportion of adults from SPA	Winter apportioning rate[1]
Cape Wrath SPA	4180	0.98	0.00675	0.4	0.00490
Flannan Islands SPA	2102	0.98	0.00339	0.4	0.00246
Handa SPA	10330	0.98	0.01668	0.4	0.01210
Mingulay & Berneray SPA	20222	0.98	0.03265	0.4	0.02369
North Rona & Sula Sgeir SPA	2178	0.98	0.00352	0.4	0.00255
Rathlin Island SPA	30786	0.98	0.04971	0.4	0.03607
Shiant Isles SPA	8496	0.98	0.01372	0.4	0.00995
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	12002	0.98	0.01938	0.3	0.01055
St Kilda SPA	3400	0.98	0.00549	0.4	0.00398
BDMPS autumn and spring migration (Furness, 2015; individual adults and immatures)	**606,914**	N/A	N/A	N/A	N/A
BDMPS Winter (Furness, 2015; individual adults and immatures)	**341,422**	N/A	N/A	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.6.3 Apportioned mortality

Table 26: Razorbill WDA-alone apportioned displacement mortality.

Displacement mortality (refer to Technical Appendix 11.4: Displacement) was apportioned to SPAs using apportioning rates for the breeding season (Table 24) and non-breeding season (Table 25).

SPA	Seasonal apportioning from the Project		Lower Displacement (60% x 3% breeding / 1% non-breeding)					Upper Displacement (60% x 5% breeding / 3% non-breeding)				
	Breeding	Non-breeding	Breeding	Autumn	Spring	Winter	Annual	Breeding	Autumn	Spring	Winter	Annual
Cape Wrath SPA	No	Yes	0	0.28	0.28	0.15	0.56	0	0.38	0.84	0.46	1.68
Flannan Islands SPA	No	Yes	0	0.06	0.14	0.08	0.28	0	0.19	0.42	0.23	0.84
Handa SPA	No	Yes	0	0.31	0.70	0.38	1.38	0	0.93	2.09	1.13	4.15
Mingulay & Berneray SPA	Yes	Yes	2.64	0.61	1.36	0.74	5.35	4.41	1.82	4.08	2.22	12.53
North Rona & Sula Sgeir SPA	No	Yes	0	0.07	0.15	0.08	0.30	0	0.20	0.44	0.24	0.87
Rathlin Island SPA	Yes	Yes	12.20	0.92	2.07	1.13	16.32	20.36	2.77	6.22	3.38	32.72
Shiant Isles SPA	No	Yes	0	0.26	0.57	0.31	1.14	0	0.76	1.72	0.93	3.41
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	No	Yes	0	0.36	0.81	0.33	1.50	0	1.08	2.42	0.99	4.49
St Kilda SPA	No	Yes	0	0.10	0.23	0.12	0.46	0	0.31	0.69	0.37	1.37

4.6.4 Change in baseline mortality rate and PVA requirements

- **Table 27: Razorbill WDA-alone and in-combination annual LOWER displacement (60% x 3% breeding / 1% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.**

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Cape Wrath SPA	4869	0.56	0.01	2.28	0.05	No	Yes	Yes
Flannan Islands SPA[1]	1715	0.28	0.02	N/A	N/A	Yes	N/A	N/A
Handa SPA	12311	1.38	0.01	4.97	0.04	No	Yes	Yes
Mingulay & Berneray SPA	17718	5.35	0.03	11.03	0.06	Yes	Yes	Yes
North Rona & Sula Sgeir SPA	594	0.30	0.05	0.30	0.05	Yes	Yes	Yes
Rathlin Island SPA	33632	16.32	0.05	25.03	0.07	Yes	Yes	Yes
Shiant Isles SPA	12044	1.14	0.01	3.94	0.03	No	Yes	Yes
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	17883	1.50	0.01	10.36	0.06	No	Yes	Yes
St Kilda SPA[1]	1230	0.46	0.04	N/A	N/A	Yes	N/A	N/A

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Flannan Islands SPA or St Kilda SPA

Table 28: Razorbill WDA-alone and in-combination annual UPPER displacement (60% x 5% breeding / 3% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination : WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Cape Wrath SPA	4869	1.68	0.03	4.71	0.10	Yes	Yes	Yes
Flannan Islands SPA[1]	1715	0.84	0.05	N/A	N/A	Yes	N/A	N/A
Handa SPA	12311	4.15	0.03	10.53	0.09	Yes	Yes	Yes
Mingulay & Berneray SPA	17718	12.53	0.07	23.19	0.13	Yes	Yes	Yes
North Rona & Sula Sgeir SPA	594	0.87	0.15	0.88	0.15	Yes	Yes	Yes
Rathlin Island SPA	33632	32.72	0.10	47.39	0.14	Yes	Yes	Yes
Shiant Isles SPA	12044	3.41	0.03	8.40	0.07	Yes	Yes	Yes
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	17883	4.49	0.03	19.47	0.11	Yes	Yes	Yes
St Kilda SPA[1]	1230	1.37	0.11	N/A	N/A	Yes	N/A	N/A

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Flannan Islands SPA or St Kilda SPA

4.7 Puffin

78. Puffin SPA proportional apportioning rates calculated for the Project are presented for the breeding season in **Table 29** and the non-breeding season in **Table 30**.

79. For the WDA-alone**, Table 31** summarises whether puffin mortality was apportioned from the breeding and/or the non-breeding season(s) to SPAs and it also presents apportioned seasonal lower displacement mortality (60% displacement and 3/1% mortality) and upper displacement mortality (60% displacement and 5/3% mortality). Project apportioned annual displacement mortality was greatest for puffin populations at St Kilda SPA followed by Shiant Isles SPA.

80. Details of seasonal and annual collision and displacement mortalities apportioned from other offshore windfarms to the same SPAs impacted by the Project are presented for the in-combination assessment in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.

81. **Table 32** (lower displacement impact scenario) and **Table 33** (upper displacement impact scenario) presents the following:

- Most recent SPA population size of adult individuals (from Burnell et al., 2023 or SMP database[7], when updated counts were available);
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms (in-combination mortality is presented only if an SPA requires an in-combination PVA); and,
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

82. For the WDA-alone, change in annual adult mortality rate was greatest at Rathlin Island SPA (=0.02% for the upper displacement scenario). WDA-alone mortality exceeded the PVA threshold of 0.02% at Rathlin Island SPA.

83. For in-combination offshore windfarms, change in annual adult mortality rate was greatest at Sule Skerry & Sule Stack SPA followed by Rathlin Island SPA (both SPAs >=0.02% for the upper displacement scenario). In-combination mortality exceeded the PVA thresholds of >= 0.02% change in baseline mortality rate for in-combination offshore windfarms and WDA-alone annual mortality >=0.2 birds at these two SPAs. No mortality data is available from other offshore windfarms to add to the in-combination assessment at Mingulay and Berneray SPA.

84. PVA model inputs and outputs for these SPAs are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**.

4.7.1 Breeding season apportioning

Table 29: Puffin breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding puffin as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
Canna and Sanday SPA	9926	116.8	13638.2	0.662	1.510	0.03327	0.05210
Flannan Isles SPA	98944	260.0	67583.7	0.851	1.175	0.05211	0.08159
Mingulay and Berneray SPA	4642	105.0	11021.9	0.725	1.380	0.01760	0.02755
Rathlin Island SPA	2348	89.1	7933.5	0.508	1.969	0.01765	0.02763
Shiant Isles SPA	129390	214.2	45890.9	0.743	1.346	0.11495	0.17999
St Kilda SPA	197586	232.0	53808.5	0.887	1.127	0.12531	0.19621
Tory Island SPA	114	128.6	16549.4	0.665	1.503	0.00031	0.00049
Other colonies within foraging range of the WDA[2]						0.27747	0.43445
Sum	**460196**		**1249513.0**		**89.665**	**0.63866**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.7.2 Non-breeding season apportioning

Table 30: Puffin non-breeding apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Non-breeding proportion of adults from SPA	Non-breeding apportioning rate[1]
Canna & Sanday SPA	1890	0.18	0.00112
Cape Wrath SPA	3204	0.18	0.00189
Flannan Isles SPA	31200	0.18	0.01844
Mingulay & Berneray SPA	6252	0.18	0.00370
North Rona & Sula Sgeir SPA	10884	0.18	0.00643
Rathlin Island SPA	1390	0.18	0.00082
Shiant Isles SPA	130340	0.18	0.07703
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	48228	0.18	0.02850
St Kilda SPA	284528	0.18	0.16816
Sule Skerry & Sule Stack SPA	118942	0.18	0.07030
BDMPS Non-breeding (Furness, 2015; individual adults and immatures)	**304,557**	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.7.3 Apportioned mortality

Table 31: Puffin WDA-alone apportioned displacement mortality.

Displacement mortality (refer to Technical Appendix 11.4: Displacement) was apportioned to SPAs using apportioning rates for the breeding season (Table 29) and non-breeding season (Table 30).

SPA	Seasonal apportioning from the Project		Lower Displacement (60% x 3% breeding / 1% non-breeding)			Upper Displacement (60% x 5% breeding / 3% non-breeding)		
	Breeding	Non-breeding	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
Canna and Sanday SPA	Yes	Yes	0.47	0.01	0.47	0.78	0.02	0.80
Cape Wrath SPA	No	Yes	0	0.01	0.01	0	0.04	0.04
Flannan Isles SPA	Yes	Yes	0.73	0.13	0.86	1.21	0.40	1.61
Mingulay and Berneray SPA	Yes	Yes	0.25	0.03	0.27	0.41	0.08	0.49
North Rona & Sula Sgeir SPA	No	Yes	0	0.05	0.05	0	0.14	0.14
Rathlin Island SPA	Yes	Yes	0.25	0.01	0.25	0.41	0.02	0.43
Shiant Isles SPA	Yes	Yes	1.61	0.55	2.17	2.68	1.66	4.34
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	No	Yes	0	0.21	0.21	0	0.61	0.61
St Kilda SPA	Yes	Yes	1.76	1.21	2.97	2.92	3.62	6.54
Sule Skerry & Sule Stack SPA	No	Yes	0	0.51	0.51	0	1.51	1.51
Tory Island SPA	Yes	No	0.004	0	<0.01	0.007	0	0.01

4.7.4 Change in baseline mortality rate and PVA requirements

- **Table 32: Puffin WDA-alone and in-combination annual LOWER displacement (60% x 3% breeding / 1% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.**

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Canna and Sanday SPA	9926	0.47	<0.01	0.47	<0.01	No	Yes	No
Cape Wrath SPA	4488	0.01	<0.01	N/A	N/A	No	No	No
Flannan Isles SPA	98944	0.86	<0.01	0.87	<0.01	No	Yes	No
Mingulay and Berneray SPA[1]	4642	0.27	0.01	N/A	N/A	No	N/A	N/A
North Rona & Sula Sgeir SPA	6602	0.05	<0.01	N/A	N/A	No	No	No
Rathlin Island SPA	2348	0.25	0.01	0.26	0.01	No	Yes	No
Shiant Isles SPA	129390	2.17	<0.01	2.18	<0.01	No	Yes	No
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	57796	0.20	<0.01	1.50	<0.01	No	Yes	No
St Kilda SPA	197586	2.97	<0.01	3.01	<0.01	No	Yes	No
Sule Skerry & Sule Stack SPA	95484	0.51	<0.01	49.10	0.05	No	Yes	Yes
Tory Island SPA	114	<0.01	<0.01	N/A	N/A	No	No	No

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Mingulay and Berneray SPA

Table 33: Puffin WDA-alone and in-combination annual UPPER displacement (60% x 5% breeding / 3% non-breeding), resultant percentage change in baseline mortality and whether a PVA is required (highlighted cells; WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Canna and Sanday SPA	9926	0.80	0.01	0.80	0.01	No	Yes	No
Cape Wrath SPA	4488	0.04	<0.01	N/A	N/A	No	No	No
Flannan Isles SPA	98944	1.61	<0.01	1.63	<0.01	No	Yes	No
Mingulay and Berneray SPA[1]	4642	0.49	0.01	N/A	N/A	No	N/A	N/A
North Rona & Sula Sgeir SPA	6602	0.14	<0.01	N/A	N/A	No	No	No
Rathlin Island SPA	2348	0.43	0.02	0.44	0.02	Yes	Yes	Yes
Shiant Isles SPA	129390	4.34	<0.01	4.38	<0.01	No	Yes	No
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	57796	0.61	<0.01	2.78	<0.01	No	Yes	No
St Kilda SPA	197586	6.54	<0.01	6.65	<0.01	No	Yes	No
Sule Skerry & Sule Stack SPA	95484	1.51	<0.01	82.44	0.09	No	Yes	Yes
Tory Island SPA	114	0.01	0.01	N/A	N/A	No	No	No

[1] No mortality data is available from other offshore windfarms to add to the in-combination assessment at Mingulay and Berneray SPA

4.8 Fulmar

85. Fulmar SPA proportional apportioning rates calculated for the Project are presented for the breeding season in **Table 34** and the non-breeding season in **Table 35**.

86. For the WDA-alone**, Table 36** summarises whether fulmar mortality was apportioned from the breeding and/or the non-breeding season(s) to SPAs and it also presents apportioned seasonal lower displacement mortality (20% displacement and 1% mortality) and upper displacement mortality (20% displacement and 3% mortality). Project apportioned annual displacement mortality was greatest for fulmar populations at St Kilda SPA.

87. Details of seasonal and annual displacement mortalities apportioned from other offshore windfarms to St Kilda SPA (the only SPA designated for breeding fulmar to require an in-combination assessment, see below) is presented for the in-combination assessment in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.

88. **Table 37** (lower displacement impact scenario) and **Table 38** (upper displacement impact scenario) presents the following:

- Most recent SPA population size of adult individuals (from Burnell et al., 2023 or SMP database[7], when updated counts were available);
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
- Apportioned annual displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms (in-combination mortality is presented only if an SPA requires an in-combination PVA); and,
- Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

89. For the WDA-alone, change in annual adult mortality rate was very low for all SPAs, (all <0.01% for both lower and upper displacement scenarios). WDA-alone mortality did not exceed the PVA threshold of 0.02% for any SPA.

90. An in-combination assessment for fulmar was required at St Kilda SPA (WDA-alone mortality was > 0.2 birds). However, change in annual adult mortality rate for in-combination offshore windfarms at St Kilda SPA was <0.02%, therefore, in-combination mortality did not exceed the PVA threshold and a PVA was not required.

4.8.1 Breeding season apportioning

Table 34: Fulmar breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding fulmar as a qualifying feature.

SPA	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
Beara Peninsula SPA	1290	596.3	355604.5	0.804	1.244	0.00133	0.00044
Blasket Islands SPA	3768	538.3	289735.1	0.824	1.213	0.00464	0.00154
Buchan Ness to Collieston Coast SPA	2264	599.1	358893.5	0.675	1.482	0.00275	0.00091
Calf of Eday SPA	4576	473.7	224360.2	0.718	1.394	0.00837	0.00277
Cape Wrath SPA	2122	327.9	107514.0	0.753	1.328	0.00771	0.00255
Clare Island SPA	5294	352.1	123950.7	0.849	1.178	0.01481	0.00490
Cliffs of Moher SPA	9602	460.3	211835.4	0.821	1.219	0.01626	0.00538
Copinsay SPA	2468	467.4	218431.8	0.710	1.408	0.00468	0.00155
Deenish Island and Scariff Island SPA	802	582.3	339034.2	0.808	1.237	0.00086	0.00029
Dingle Peninsula SPA	1704	518.1	268468.8	0.822	1.216	0.00227	0.00075
Duvillaun Islands SPA	1094	313.4	98240.9	0.853	1.173	0.00384	0.00127
East Caithness Cliffs SPA	20654	487.7	237830.4	0.711	1.406	0.03594	0.01190
Fair Isle SPA	64982	544.1	296014.2	0.708	1.412	0.09123	0.03022
Fetlar SPA	18354	659.5	434944.6	0.715	1.398	0.01737	0.00575
Flamborough and Filey Coast SPA	1598	974.0	948615.9	0.584	1.713	0.00085	0.00028
Flannan Isles SPA	6132	260.0	67588.8	0.812	1.232	0.03289	0.01089
Foula SPA	20506	559.4	312925.6	0.724	1.382	0.02666	0.00883
Fowlsheugh SPA	978	657.0	431673.6	0.676	1.479	0.00099	0.00033

SPA	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
Handa SPA	1730	293.6	86226.8	0.757	1.322	0.00780	0.00258
Hermaness, Saxa Vord and Valla Field SPA	26416	660.6	436402.8	0.717	1.394	0.02484	0.00823
High Island, Inishshark and Davillaun SPA	3122	367.4	135012.6	0.852	1.174	0.00799	0.00265
Horn Head to Fanad Head SPA	1316	125.8	15836.6	0.803	1.245	0.03046	0.01009
Hoy SPA	38744	422.6	178581.3	0.721	1.388	0.08861	0.02935
Iveragh Penninsula SPA	2060	558.0	311349.8	0.816	1.226	0.00239	0.00079
Kerry Head SPA	602	501.8	251833.6	0.817	1.224	0.00086	0.00029
Lambay Island SPA	544	307.5	94551.7	0.737	1.357	0.00230	0.00076
Mingulay and Berneray SPA	10160	105.0	11028.1	0.798	1.253	0.33969	0.11250
North Caithness Cliffs SPA	31044	417.0	173924.8	0.717	1.394	0.07325	0.02426
North Rona and Sula Sgeir SPA	4420	355.0	126024.1	0.783	1.277	0.01318	0.00437
Noss SPA	8694	611.9	374405.5	0.710	1.408	0.00962	0.00319
Puffin Island SPA (ROI)	1438	565.7	320008.0	0.815	1.227	0.00162	0.00054
Rathlin Island SPA	2076	89.1	7933.7	0.765	1.308	0.10072	0.03336
Rousay SPA	4384	456.7	208608.1	0.721	1.387	0.00858	0.00284
Saltee Islands SPA	714	472.9	223637.5	0.719	1.392	0.00131	0.00043
Shiant Isles SPA	3012	214.2	45881.6	0.788	1.269	0.02452	0.00812
Skelligs SPA	1518	572.3	327527.3	0.816	1.226	0.00167	0.00055
St Kilda SPA	41424	232.0	53824.0	0.827	1.209	0.27394	0.09073
Sumburgh Head SPA	11900	578.3	334430.9	0.709	1.411	0.01477	0.00489
Tory Island SPA	1312	128.6	16550.3	0.807	1.239	0.02889	0.00957
Troup, Pennan and Lion's Heads SPA	2550	553.5	306411.7	0.686	1.459	0.00357	0.00118

SPA	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight[1]	Proportional apportioning weight
West Donegal Coast SPA	2964	201.0	36526.3	0.818	1.222	0.02919	0.00967
West Westray SPA	2198	457.6	209417.3	0.724	1.381	0.00427	0.00141
Other colonies within foraging range of the WDA[2]						1.65185	0.54709
Sum	**666622**		**667737893.6**		**3403.573**	**3.01934**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/ (sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.8.2 Non-breeding season apportioning

Table 35: Fulmar autumn, spring and winter apportioning rates for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Autumn and spring proportion of adults from SPA	Autumn and spring apportioning rate[1]	Winter proportion of adults from SPA	Winter apportioning rate[1]
Cape Wrath SPA	4230	1	0.00511	0.7	0.00532
Flannan Isles SPA	14656	1	0.01770	0.7	0.01844
Handa SPA	3740	1	0.00452	0.7	0.00471
Mingulay & Berneray SPA	18092	1	0.02185	0.7	0.02276
North Rona & Sula Sgeir SPA	10000	1	0.01207	0.7	0.01258
Rathlin Island SPA	3036	1	0.00367	0.7	0.00382
Shiant Isles SPA	8774	1	0.01059	0.7	0.01104
St Kilda SPA	132110	1	0.15952	0.7	0.16622
BDMPS autumn & spring (Furness, 2015; individual adults and immatures)	**828,194**	N/A	N/A	N/A	N/A
BDMPS Winter (Furness, 2015; individual adults and immatures)	**556,367**	N/A	N/A	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.8.3 Apportioned mortality

Table 36: Fulmar WDA-alone apportioned displacement mortality.

Displacement mortality (refer to Technical Appendix 11.4: Displacement) was apportioned to SPAs using apportioning rates for the breeding season (Table 34) and non-breeding season (Table 35).

SPA	Seasonal apportioning from the Project		Lower Displacement (20% x 1%)					Upper Displacement (20% x 3%)				
	Breeding	Non-breeding	Breeding	Autumn	Spring	Winter	Annual	Breeding	Autumn	Spring	Winter	Annual
Beara Peninsula SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Blasket Islands SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Buchan Ness to Collieston Coast SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Calf of Eday SPA	Yes	No	<0.001	0	0	0	<0.001	0.001	0	0	0	0.001
Cape Wrath SPA	Yes	Yes	<0.001	0.001	0.002	0.001	0.003	0.001	0.002	0.004	0.002	0.008
Clare Island SPA	Yes	No	0.001	0	0	0	0.001	0.002	0	0	0	0.002
Cliffs of Moher SPA	Yes	No	0.001	0	0	0	0.001	0.002	0	0	0	0.002
Copinsay SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Deenish Island and Scariff Island SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Dingle Peninsula SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Duvillaun Islands SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
East Caithness Cliffs SPA	Yes	No	0.001	0	0	0	0.001	0.004	0	0	0	0.004

SPA	Seasonal apportioning from the Project		Lower Displacement (20% x 1%)					Upper Displacement (20% x 3%)				
	Breeding	Non-breeding	Breeding	Autumn	Spring	Winter	Annual	Breeding	Autumn	Spring	Winter	Annual
Fair Isle SPA	Yes	No	0.004	0	0	0	0.004	0.009	0	0	0	0.009
Fetlar SPA	Yes	No	0.001	0	0	0	0.001	0.002	0	0	0	0.002
Flamborough and Filey Coast SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Flannan Isles SPA	Yes	Yes	0.001	0.002	0.005	0.002	0.010	0.003	0.005	0.014	0.006	0.028
Foula SPA	Yes	No	0.001	0	0	0	0.001	0.003	0	0	0	0.003
Fowlsheugh SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Handa SPA	Yes	Yes	<0.001	<0.001	0.001	<0.001	0.003	0.001	0.001	0.004	0.001	0.007
Hermaness, Saxa Vord and Valla Field SPA	Yes	No	0.001	0	0	0	0.001	0.003	0	0	0	0.003
High Island, Inishshark and Davillaun SPA	Yes	No	<0.001	0	0	0	<0.001	0.001	0	0	0	0.001
Horn Head to Fanad Head SPA	Yes	No	0.001	0	0	0	0.001	0.003	0	0	0	0.003
Hoy SPA	Yes	No	0.004	0	0	0	0.004	0.009	0	0	0	0.009
Iveragh Penninsula SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Kerry Head SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Lambay Island SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Mingulay and Berneray SPA	Yes	Yes	0.014	0.002	0.007	0.002	0.025	0.035	0.007	0.017	0.007	0.066
North Caithness Cliffs SPA	Yes	No	0.003	0	0	0	0.003	0.008	0	0	0	0.008

SPA	Seasonal apportioning from the Project		Lower Displacement (20% x 1%)					Upper Displacement (20% x 3%)				
	Breeding	Non-breeding	Breeding	Autumn	Spring	Winter	Annual	Breeding	Autumn	Spring	Winter	Annual
North Rona and Sula Sgeir SPA	Yes	Yes	0.001	0.001	0.004	0.001	0.007	0.001	0.004	0.010	0.004	0.018
Noss SPA	Yes	No	<0.001	0	0	0	<0.001	0.001	0	0	0	0.001
Puffin Island SPA (ROI)	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Rathlin Island SPA	Yes	Yes	0.004	<0.001	0.001	<0.001	0.006	0.010	0.001	0.003	0.001	0.016
Rousay SPA	Yes	No	<0.001	0	0	0	<0.001	0.001	0	0	0	0.001
Saltee Islands SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
Shiant Isles SPA	Yes	Yes	<0.001	0.001	0.003	0.001	0.006	0.003	0.003	0.008	0.003	0.017
Skelligs SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
St Kilda SPA	Yes	Yes	0.011	0.016	0.048	0.017	0.092	0.028	0.048	0.128	0.050	0.253
Sumburgh Head SPA	Yes	No	0.001	0	0	0	0.001	0.002	0	0	0	0.002
Tory Island SPA	Yes	No	0.001	0	0	0	0.001	0.003	0	0	0	0.003
Troup, Pennan and Lion's Heads SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001
West Donegal Coast SPA	Yes	No	0.001	0	0	0	0.001	0.003	0	0	0	0.003
West Westray SPA	Yes	No	<0.001	0	0	0	<0.001	<0.001	0	0	0	<0.001

4.8.4 Change in baseline mortality rate and PVA requirements

- **Table 37: Fulmar WDA-alone and in-combination annual LOWER displacement (20% x 1%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.**

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Beara Peninsula SPA	1290	<0.001	<0.01	N/A	N/A	No	No	No
Blasket Islands SPA	3768	<0.001	<0.01	N/A	N/A	No	No	No
Buchan Ness to Collieston Coast SPA	2264	<0.001	<0.01	N/A	N/A	No	No	No
Calf of Eday SPA	4576	<0.001	<0.01	N/A	N/A	No	No	No
Cape Wrath SPA	2122	0.003	<0.01	N/A	N/A	No	No	No
Clare Island SPA	5294	0.001	<0.01	N/A	N/A	No	No	No
Cliffs of Moher SPA	9602	0.001	<0.01	N/A	N/A	No	No	No
Copinsay SPA	2468	<0.001	<0.01	N/A	N/A	No	No	No
Deenish Island and Scariff Island SPA	802	<0.001	<0.01	N/A	N/A	No	No	No
Dingle Peninsula SPA	1704	<0.001	<0.01	N/A	N/A	No	No	No
Duvillaun Islands SPA	1094	<0.001	<0.01	N/A	N/A	No	No	No
East Caithness Cliffs SPA	20654	0.001	<0.01	N/A	N/A	No	No	No
Fair Isle SPA	64982	0.004	<0.01	N/A	N/A	No	No	No
Fetlar SPA	18354	0.001	<0.01	N/A	N/A	No	No	No
Flamborough and Filey Coast SPA	1598	<0.001	<0.01	N/A	N/A	No	No	No

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Flannan Isles SPA	6132	0.010	<0.01	N/A	N/A	No	No	No
Foula SPA	20506	0.001	<0.01	N/A	N/A	No	No	No
Fowlsheugh SPA	978	<0.001	<0.01	N/A	N/A	No	No	No
Handa SPA	1730	0.003	<0.01	N/A	N/A	No	No	No
Hermaness, Saxa Vord and Valla Field SPA	26416	0.001	<0.01	N/A	N/A	No	No	No
High Island, Inishshark and Davillaun SPA	3122	<0.001	<0.01	N/A	N/A	No	No	No
Horn Head to Fanad Head SPA	1316	0.001	<0.01	N/A	N/A	No	No	No
Hoy SPA	38744	0.004	<0.01	N/A	N/A	No	No	No
Iveragh Penninsula SPA	2060	<0.001	<0.01	N/A	N/A	No	No	No
Kerry Head SPA	602	<0.001	<0.01	N/A	N/A	No	No	No
Lambay Island SPA	544	<0.001	<0.01	N/A	N/A	No	No	No
Mingulay and Berneray SPA	10160	0.025	<0.01	N/A	N/A	No	No	No
North Caithness Cliffs SPA	31044	0.003	<0.01	N/A	N/A	No	No	No
North Rona and Sula Sgeir SPA	4420	0.007	<0.01	N/A	N/A	No	No	No
Noss SPA	8694	<0.001	<0.01	N/A	N/A	No	No	No
Puffin Island SPA (ROI)	1438	<0.001	<0.01	N/A	N/A	No	No	No
Rathlin Island SPA	2076	0.006	<0.01	N/A	N/A	No	No	No
Rousay SPA	4384	<0.001	<0.01	N/A	N/A	No	No	No

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Saltee Islands SPA	714	<0.001	<0.01	N/A	N/A	No	No	No
Shiant Isles SPA	3012	0.006	<0.01	N/A	N/A	No	No	No
Skelligs SPA	1518	<0.001	<0.01	N/A	N/A	No	No	No
St Kilda SPA	41424	0.092	<0.01	N/A	N/A	No	No	No
Sumburgh Head SPA	11900	0.001	<0.01	N/A	N/A	No	No	No
Tory Island SPA	1312	0.001	<0.01	N/A	N/A	No	No	No
Troup, Pennan and Lion's Heads SPA	2550	<0.001	<0.01	N/A	N/A	No	No	No
West Donegal Coast SPA	2964	0.001	<0.01	N/A	N/A	No	No	No
West Westray SPA	2198	<0.001	<0.01	N/A	N/A	No	No	No

Table 38: Fulmar WDA-alone and in-combination annual UPPER displacement (20% x 3%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination : Change in mortality >=0.02%
Beara Peninsula SPA	1290	<0.001	<0.01	N/A	N/A	No	No	No
Blasket Islands SPA	3768	<0.001	<0.01	N/A	N/A	No	No	No
Buchan Ness to Collieston Coast SPA	2264	<0.001	<0.01	N/A	N/A	No	No	No
Calf of Eday SPA	4576	0.001	<0.01	N/A	N/A	No	No	No
Cape Wrath SPA	2122	0.008	<0.01	N/A	N/A	No	No	No
Clare Island SPA	5294	0.002	<0.01	N/A	N/A	No	No	No
Cliffs of Moher SPA	9602	0.002	<0.01	N/A	N/A	No	No	No
Copinsay SPA	2468	<0.001	<0.01	N/A	N/A	No	No	No
Deenish Island and Scariff Island SPA	802	<0.001	<0.01	N/A	N/A	No	No	No
Dingle Peninsula SPA	1704	<0.001	<0.01	N/A	N/A	No	No	No
Duvillaun Islands SPA	1094	<0.001	<0.01	N/A	N/A	No	No	No
East Caithness Cliffs SPA	20654	0.004	<0.01	N/A	N/A	No	No	No
Fair Isle SPA	64982	0.009	<0.01	N/A	N/A	No	No	No
Fetlar SPA	18354	0.002	<0.01	N/A	N/A	No	No	No
Flamborough and Filey Coast SPA	1598	<0.001	<0.01	N/A	N/A	No	No	No
Flannan Isles SPA	6132	0.028	<0.01	N/A	N/A	No	No	No
Foula SPA	20506	0.003	<0.01	N/A	N/A	No	No	No

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination : Change in mortality >=0.02%
Fowlsheugh SPA	978	<0.001	<0.01	N/A	N/A	No	No	No
Handa SPA	1730	0.007	<0.01	N/A	N/A	No	No	No
Hermaness, Saxa Vord and Valla Field SPA	26416	0.003	<0.01	N/A	N/A	No	No	No
High Island, Inishshark and Davillaun SPA	3122	0.001	<0.01	N/A	N/A	No	No	No
Horn Head to Fanad Head SPA	1316	0.003	<0.01	N/A	N/A	No	No	No
Hoy SPA	38744	0.009	<0.01	N/A	N/A	No	No	No
Iveragh Penninsula SPA	2060	<0.001	<0.01	N/A	N/A	No	No	No
Kerry Head SPA	602	<0.001	<0.01	N/A	N/A	No	No	No
Lambay Island SPA	544	<0.001	<0.01	N/A	N/A	No	No	No
Mingulay and Berneray SPA	10160	0.066	<0.01	N/A	N/A	No	No	No
North Caithness Cliffs SPA	31044	0.008	<0.01	N/A	N/A	No	No	No
North Rona and Sula Sgeir SPA	4420	0.018	<0.01	N/A	N/A	No	No	No
Noss SPA	8694	0.001	<0.01	N/A	N/A	No	No	No
Puffin Island SPA (ROI)	1438	<0.001	<0.01	N/A	N/A	No	No	No
Rathlin Island SPA	2076	0.016	<0.01	N/A	N/A	No	No	No
Rousay SPA	4384	0.001	<0.01	N/A	N/A	No	No	No
Saltee Islands SPA	714	<0.001	<0.01	N/A	N/A	No	No	No
Shiant Isles SPA	3012	0.017	<0.01	N/A	N/A	No	No	No
Skelligs SPA	1518	<0.001	<0.01	N/A	N/A	No	No	No
St Kilda SPA	41424	0.256	<0.01	0.69	<0.01	No	Yes	No

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination : Change in mortality >=0.02%
Sumburgh Head SPA	11900	0.002	<0.01	N/A	N/A	No	No	No
Tory Island SPA	1312	0.003	<0.01	N/A	N/A	No	No	No
Troup, Pennan and Lion's Heads SPA	2550	<0.001	<0.01	N/A	N/A	No	No	No
West Donegal Coast SPA	2964	0.003	<0.01	N/A	N/A	No	No	No
West Westray SPA	2198	<0.001	<0.01	N/A	N/A	No	No	No

4.9 Gannet

91. Gannet SPA proportional apportioning rates calculated for the Project are presented for the breeding season in **Table 39** and the non-breeding season in **Table 40**.

92. For the WDA-alone**, Table 41** summarises whether gannet mortality was apportioned from the breeding and/or the non-breeding season(s) to SPAs and it also presents apportioned seasonal collision mortality, lower displacement mortality (70% displacement and 1% mortality) and upper displacement mortality (70% displacement and 3% mortality). A total annual combined mortality for collision plus lower displacement and collision plus upper displacement for the WDA-alone is also presented. Project apportioned annual mortality was greatest for gannet populations at Ailsa Craig SPA followed by St Kilda SPA.

93. Details of seasonal and annual collision and displacement mortalities apportioned from other offshore windfarms to the same SPAs impacted by the Project are presented for the in-combination assessment in **Technical Appendix 11.5: Cumulative and In-Combination Mortality**.

94. **Table 42** (lower displacement impact scenario) and **Table 43** (upper displacement impact scenario) presents the following:

    - Most recent SPA population size of adult individuals (from Burnell et al., 2023 or SMP database[7], when updated counts were available);
    - Apportioned annual collision plus displacement mortality and change in annual adult mortality rate for each SPA for the WDA-alone;
    - Apportioned annual collision plus displacement mortality and change in annual adult mortality rate for each SPA for all in-combination offshore windfarms (in-combination mortality is presented only if an SPA requires an in-combination PVA); and,
    - Identifies which SPA populations required a PVA for the WDA-alone (i.e. a WDA-alone PVA is required if change in baseline mortality rate for the WDA-alone is >= 0.02%) and for in-combination impacts (i.e. an in-combination PVA is required if change in baseline mortality rate for in-combination offshore windfarms is >= 0.02% and the WDA-alone annual mortality >=0.2 birds).

95. For the WDA-alone, change in annual adult mortality rate was very low for all SPAs, (all <0.01% for both lower and upper displacement scenarios). WDA-alone mortality did not exceed the PVA threshold of 0.02% for any SPA.

96. An in-combination assessment for gannet was required at Ailsa Craig SPA, Grassholm SPA, North Rona and Sula Sgeir SPA,St Kilda SPA and Sula Sgeir and Sule Stack SPA (WDA-alone mortality was > 0.2 birds). In-combination mortality exceeded the PVA thresholds of >= 0.02% change in baseline mortality rate for in-combination offshore windfarms and WDA-alone annual mortality >=0.2 birds at Ailsa Craig SPA. The PVA model inputs and outputs for Ailsa Craig SPA are presented in **Technical Appendix 11.7: Population Viability Analysis (PVA)**.

4.9.1 Breeding season apportioning

Table 39: Gannet breeding season apportioning rates to SPA or non-SPA colonies for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding gannet as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance2 (km2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight1	Proportional apportioning weight
Ailsa Craig SPA	61930	144.7	20934.3	0.656	1.524	1.37421	0.55287
Grassholm SPA	34090	496.8	246787.9	0.624	1.603	0.06748	0.02715
North Rona and Sula Sgeir SPA	18990	355.0	126024.1	0.882	1.134	0.05209	0.02096
Saltee Islands SPA	9444	472.9	223637.5	0.663	1.508	0.01942	0.00781
St Kilda SPA	118410	232.0	53820.9	0.836	1.196	0.80188	0.32261
Sule Skerry and Sule Stack SPA	15648	384.5	147806.0	0.880	1.137	0.03668	0.01476
Other colonies within foraging range of the WDA[2]						0.41142	0.05384
Sum	**280332**		**1711849.2**		**20.032**	**2.48559**	**1.00000**

[1] Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

[2] Other colonies within foraging range are listed in **ANNEX A**

4.9.2 Non-breeding season apportioning

Table 40: Gannet autumn and spring apportioning weights for the Project. BDMPS counts and adult proportions are from Furness (2015) Appendix A.

SPA contributing site to BDMPS	SPA contribution to BDMPS count (adult individuals)	Autumn proportion of adults from SPA	Autumn apportioning rate[1]	Spring proportion of adults from SPA	Spring apportioning rate[1]
Ailsa Craig SPA	54260	1	0.09939	1	0.08198
Grassholm SPA	78584	1	0.14394	1	0.11873
North Rona & Sula Sgeir SPA	18450	0.9	0.03041	1	0.02787
St Kilda SPA	119244	0.9	0.19657	1	0.18016
Sule Skerry & Sule Stack SPA	9350	0.9	0.01541	1	0.01413
BDMPS Autumn (Furness, 2015; individual adults and immatures)	**545,954**	N/A	N/A	N/A	N/A
BDMPS Spring (Furness, 2015; individual adults and immatures)	**661,888**	N/A	N/A	N/A	N/A

[1] Individual SPA non-breeding season apportioning rate = ([SPA counts (adults)] * [SPA adult proportion in BDMPS]) / [BDMPS population]

4.9.3 Apportioned mortality

Table 41: Gannet WDA-alone apportioned collision and displacement mortality.

Collision and displacement mortality (refer to Technical Appendix 11.3: Collision Risk Modelling and Technical Appendix 11.4: Displacement respectively) was apportioned to SPAs using apportioning rates for the breeding season (Table 39) and non-breeding season (Table 40).

SPA	Seasonal apportioning from the Project		Collisions				Lower Displacement (70% x 1%)				Upper Displacement (70% x 3%)				Total annual mortality	
	Breeding	Non-breeding	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Breeding	Autumn	Spring	Annual	Collisions & Lower Displacement	Collisions & Upper Displacement
Ailsa Craig SPA	Yes	Yes	3.67	0.025	0.045	3.74	0.82	0.11	0.08	1.01	2.44	0.32	0.24	2.99	4.75	6.73
Grassholm SPA	Yes	Yes	0.18	0.036	0.065	0.28	0.04	0.16	0.12	0.32	0.12	0.46	0.34	0.92	0.60	1.21
North Rona and Sula Sgeir SPA	Yes	Yes	0.14	0.008	0.015	0.16	0.03	0.03	0.03	0.09	0.09	0.10	0.08	0.27	0.25	0.43
Saltee Islands SPA	Yes	No	0.05	0	0	0.05	0.01	0	0	0.01	0.03	0	0	0.03	0.06	0.09
St Kilda SPA	Yes	Yes	2.14	0.049	0.099	2.29	0.48	0.22	0.18	0.88	1.42	0.63	0.52	2.57	3.17	4.86
Sule Skerry and Sule Stack SPA	Yes	Yes	0.10	0.004	0.008	0.11	0.02	0.02	0.01	0.05	0.07	0.05	0.04	0.16	0.16	0.26

4.9.4 Change in baseline mortality rate and PVA requirements

Table 42: Gannet WDA-alone and in-combination summed collision plus LOWER displacement (70% x 1%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2. Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Ailsa Craig SPA	61930	4.75	0.01	22.70	0.04	No	Yes	Yes
Grassholm SPA	34090	0.60	<0.01	0.92	<0.01	No	Yes	No
North Rona and Sula Sgeir SPA	18990	0.25	<0.01	0.28	<0.01	No	Yes	No
Saltee Islands SPA	9444	0.06	<0.01	N/A	N/A	No	No	No
St Kilda SPA	118410	3.17	<0.01	3.47	<0.01	No	Yes	No
Sule Skerry and Sule Stack SPA	15648	0.16	<0.01	N/A	N/A	No	No	No

Table 43: Gannet WDA-alone and in-combination summed collision plus UPPER displacement (70% x 3%), resultant percentage change in baseline mortality and whether a PVA is required (WDA-alone: change in mortality >=0.02%; in-combination: change in mortality >=0.02% & WDA-alone annual mortality >=0.2). Most recent population size are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available.

SPA	Most recent population size (Adult Individuals)	WDA-alone		In-combination		PVA required?		
		Annual mortality	Change in baseline mortality rate (%)	Annual mortality	Change in baseline mortality rate (%)	WDA-alone: Change in mortality >=0.02%	In-combination: WDA-alone annual mortality >=0.2 birds	In-combination: Change in mortality >=0.02%
Ailsa Craig SPA	61930	6.73	0.01	36.10	0.06	No	Yes	Yes
Grassholm SPA	34090	1.21	<0.01	2.14	0.01	No	Yes	No
North Rona and Sula Sgeir SPA	18990	0.43	<0.01	0.52	<0.01	No	Yes	No
Saltee Islands SPA	9444	0.09	<0.01	N/A	N/A	No	No	No
St Kilda SPA	118410	4.86	<0.01	5.71	<0.01	No	Yes	No
Sule Skerry and Sule Stack SPA	15648	0.26	<0.01	0.31	<0.01	No	Yes	No

5.0 References

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ANNEX A. BREEDING SEASON APPORTIONING TO SPAS AND NON-SPAS

Kittiwake

Table 44: Kittiwake breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding kittiwake as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Ailsa Craig SPA	824	144.7	20938.1	0.474	2.111	0.02605	0.00357
Aughris Head SPA	1110	249.2	62088.4	0.678	1.475	0.00827	0.00113
Canna and Sanday SPA	2956	116.8	13642.2	0.681	1.469	0.09983	0.01367
Flannan Isles SPA	1632	260.0	67583.7	0.847	1.181	0.00894	0.00122
Handa SPA	9178	293.6	86222.9	0.789	1.267	0.04229	0.00579
Horn Head to Fanad Head SPA	3640	125.8	14467.0	0.643	1.554	0.12262	0.01679
Mingulay and Berneray SPA	4088	105.0	11028.1	0.709	1.410	0.16385	0.02243
North Colonsay and Western Cliffs SPA	9852	38.9	1513.2	0.576	1.735	3.54191	0.48492
Rathlin Island SPA	19258	89.1	7938.8	0.509	1.965	1.49422	0.20457
Rum SPA	1640	110.6	12232.3	0.671	1.490	0.06264	0.00858
Shiant Isles SPA	2318	214.2	45890.9	0.776	1.289	0.02042	0.00280
St Kilda SPA	1658	232.0	53808.5	0.873	1.146	0.01107	0.00152
West Donegal Coast SPA	1322	201.0	40401.0	0.682	1.467	0.01505	0.00206
Inishtrahull Island SPA	14	74.5	5555.3	0.588	1.701	0.00134	0.00018
Sheep Island SPA	460	88.9	7911.3	0.514	1.947	0.03550	0.00486

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Treshnish Isles SPA	1448	54.3	2944.1	0.621	1.609	0.24963	0.03418
Aird Ghlas - Sron na Cleite	0	220.2	48501.1	0.760	1.316	0.00000	0.00000
An t-Iasgair Group	160	193.6	37476.8	0.757	1.321	0.00177	0.00024
Ard Beag to Ardmore Point	0	173.8	30214.1	0.746	1.340	0.00000	0.00000
Bagh a Tuath	48	252.4	63724.6	0.789	1.267	0.00030	0.00004
Balcary Point 1	228	269.8	72767.4	0.439	2.279	0.00224	0.00031
Benaderreen	64	260.4	67806.3	0.698	1.432	0.00042	0.00006
Big Scar	104	209.2	43775.9	0.418	2.394	0.00178	0.00024
Biod a' Choltraiche to Creag an Fhithich	0	182.3	33226.9	0.749	1.334	0.00000	0.00000
Biod Ruadh to Stac a' Mheadais	138	139.4	19445.2	0.704	1.420	0.00316	0.00043
Buaile nan Caorach	186	289.3	83689.2	0.811	1.234	0.00086	0.00012
Burrow Head	0	229.1	52471.7	0.419	2.387	0.00000	0.00000
Calf of Man	0	251.3	63136.5	0.373	2.682	0.00000	0.00000
Campay	0	260.7	67944.0	0.813	1.230	0.00000	0.00000
Carrick-a-rede	554	90.2	8139.7	0.512	1.955	0.04171	0.00571
Castlerock	234	95.7	9153.7	0.544	1.839	0.01474	0.00202
Ceann a Mhara	1568	51.1	2608.5	0.638	1.568	0.29561	0.04047
Cellar Head	0	276.0	76169.7	0.802	1.247	0.00000	0.00000
Chicken Head	20	246.4	60693.4	0.789	1.268	0.00013	0.00002
Cnoc a Phosaidh	0	246.1	60557.6	0.789	1.268	0.00000	0.00000
Coppay	390	203.5	41422.1	0.792	1.262	0.00373	0.00051
Creag na h-Eiginn - The Aird	418	207.4	42995.3	0.752	1.329	0.00405	0.00055
Creevagh Head	1122	253.8	64417.2	0.694	1.441	0.00787	0.00108
Culkein - Point of Stoer	0	280.6	78732.8	0.782	1.279	0.00000	0.00000

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Downpatrick Head	1310	255.1	65084.0	0.696	1.436	0.00906	0.00124
Dunluce 1	0	90.2	8143.1	0.527	1.898	0.00000	0.00000
Eagamol	40	95.1	9048.4	0.656	1.525	0.00211	0.00029
Eilean Beag	0	61.4	3769.5	0.574	1.742	0.00000	0.00000
Eilean Molach	0	241.9	58511.0	0.817	1.224	0.00000	0.00000
Eilean Mor	0	60.4	3652.5	0.574	1.742	0.00000	0.00000
Eilean Mor Bayble	30	248.4	61680.1	0.788	1.268	0.00019	0.00003
Eilean na h-Airde	54	127.7	16305.9	0.681	1.468	0.00152	0.00021
Esky bay	140	82.6	6829.5	0.588	1.702	0.01094	0.00150
Fladda Chuain to Gearran Island	928	197.9	39164.0	0.764	1.310	0.00973	0.00133
Flodigarry - Creag na h-Eiginn	400	209.2	43745.1	0.751	1.332	0.00382	0.00052
Gallan Head	0	250.4	62707.8	0.818	1.223	0.00000	0.00000
Geodha a' Gharaidh	0	248.0	61525.3	0.788	1.268	0.00000	0.00000
Geodha nam Bradan	0	253.8	64413.6	0.815	1.227	0.00000	0.00000
Glac Na Criche SSSI	20	25.1	629.7	0.562	1.781	0.01773	0.00243
Glen Maye - Peel	108	242.3	58717.3	0.377	2.652	0.00153	0.00021
Glen Tolsta	0	265.6	70554.4	0.796	1.256	0.00000	0.00000
Glinsk	0	265.3	70371.7	0.703	1.423	0.00000	0.00000
Gob na Hoe to Ramasaig Bay	0	151.0	22813.3	0.726	1.377	0.00000	0.00000
Gobbins	2290	145.6	21200.8	0.454	2.201	0.07455	0.01021
Guns Island	0	213.5	45589.8	0.409	2.446	0.00000	0.00000
Haskeir	444	196.7	38703.4	0.809	1.236	0.00445	0.00061
Islay 53	782	34.3	1173.3	0.556	1.800	0.37615	0.05150
Islay 54	0	34.9	1215.3	0.555	1.801	0.00000	0.00000

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Kid Island	310	277.4	76961.1	0.710	1.408	0.00178	0.00024
Larribane 2	570	90.2	8143.2	0.512	1.954	0.04289	0.00587
Leum Langa	0	277.6	77041.6	0.803	1.245	0.00000	0.00000
Lighthouse	0	288.2	83033.5	0.811	1.234	0.00000	0.00000
Little Skerries	0	89.4	7995.3	0.534	1.874	0.00000	0.00000
Lobaid	42	268.4	72037.1	0.797	1.254	0.00023	0.00003
Loch Sgeireach	0	273.5	74828.7	0.801	1.249	0.00000	0.00000
Lower Bayble Bay	0	248.8	61913.6	0.789	1.268	0.00000	0.00000
Lythe Mead to Carrick-Kee	502	198.4	39356.3	0.416	2.403	0.00961	0.00132
Maggy's Leap 1/Donnard Cove	184	239.1	57180.1	0.428	2.339	0.00236	0.00032
Maggy's Leap to Newcastle 1	1176	239.1	57152.3	0.428	2.339	0.01509	0.00207
Meikle Ross	0	252.9	63944.9	0.430	2.328	0.00000	0.00000
Muck B	8	93.0	8646.3	0.653	1.532	0.00044	0.00006
Muck E	0	95.6	9143.5	0.654	1.529	0.00000	0.00000
Muck Island	830	145.3	21114.9	0.454	2.201	0.02712	0.00371
Mull Of Galloway RSPB	164	198.4	39358.2	0.416	2.403	0.00314	0.00043
Mussenden	88	95.7	9154.8	0.546	1.833	0.00552	0.00076
Neist Lighthouse to Mointeach nan Tarbh	124	156.0	24343.8	0.733	1.364	0.00218	0.00030
Old Hill Whole Island	186	258.5	66841.7	0.816	1.226	0.00107	0.00015
Old Hill/Southeast Side	0	258.6	66862.8	0.816	1.226	0.00000	0.00000
Old Hill/West Side	0	259.1	67156.3	0.815	1.227	0.00000	0.00000
Pabay	4	165.9	27519.8	0.694	1.440	0.00007	0.00001
Pigs Paradise 7	258	29.1	847.8	0.576	1.737	0.16573	0.02269
Point of Stoer - Cluas Deas	514	277.3	76887.2	0.783	1.276	0.00268	0.00037

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Poll Eistean	0	286.2	81918.6	0.809	1.236	0.00000	0.00000
Port Mona	50	192.5	37061.7	0.419	2.387	0.00101	0.00014
Port St Mary - Sound	1106	257.1	66112.9	0.372	2.685	0.01408	0.00193
Portrush 1	212	92.0	8470.0	0.534	1.873	0.01469	0.00201
Portrush 1A	80	91.9	8450.9	0.534	1.871	0.00555	0.00076
Portrush 1B	16	92.1	8479.4	0.535	1.870	0.00111	0.00015
Portrush 1C	520	92.1	8475.4	0.535	1.869	0.03596	0.00492
Portrush 2	126	92.0	8468.7	0.535	1.868	0.00871	0.00119
Portrush 3	6	92.1	8491.0	0.536	1.866	0.00041	0.00006
Porturlin 4	0	270.9	73363.9	0.708	1.413	0.00000	0.00000
Porturlin 5	14	271.6	73749.8	0.708	1.413	0.00008	0.00001
Ramsey - Port Mooar	156	249.5	62261.8	0.384	2.606	0.00205	0.00028
Rockabill	240	296.6	87942.1	0.453	2.206	0.00189	0.00026
Rubh' a' Chaise	104	250.1	62568.5	0.789	1.267	0.00066	0.00009
Rubha Deas	14	255.0	65038.3	0.790	1.265	0.00009	0.00001
Rubha Dubh	0	277.0	76755.1	0.803	1.246	0.00000	0.00000
Rubha Mor	0	252.8	63894.9	0.816	1.225	0.00000	0.00000
Rubha na Creige Moire	22	233.5	54528.2	0.785	1.274	0.00016	0.00002
Rubha Reidh - Camas Mor	0	225.0	50624.3	0.764	1.309	0.00000	0.00000
Rubha Riadhain	78	195.0	38031.2	0.742	1.347	0.00087	0.00012
Sanda Islands	66	116.1	13489.6	0.485	2.064	0.00317	0.00043
Skelp 2	0	268.3	71985.7	0.704	1.421	0.00000	0.00000
Skelp 4	182	268.7	72220.9	0.704	1.420	0.00112	0.00015
South Lub Score	98	193.4	37401.2	0.754	1.327	0.00109	0.00015
Spainneavaig	196	284.8	81084.4	0.808	1.237	0.00094	0.00013

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Sron na Cleite - Rubha Reidh	0	222.7	49586.3	0.762	1.313	0.00000	0.00000
St Bees Head RSPB	1178	281.2	79057.5	0.416	2.404	0.01123	0.00154
Stac Shurardail	56	246.7	60874.4	0.789	1.267	0.00037	0.00005
Stags of Broadhaven	348	270.4	73099.1	0.710	1.408	0.00210	0.00029
The Aird - Rubha Hunish	16	202.7	41105.6	0.757	1.321	0.00016	0.00002
The Oa RSPB	272	53.5	2860.7	0.540	1.853	0.05523	0.00756
Tiumpan Head	62	258.4	66778.1	0.791	1.264	0.00037	0.00005
Toa Mor to Toa Beg	0	255.1	65061.4	0.814	1.229	0.00000	0.00000
Toe Head 3	334	203.3	41320.8	0.790	1.266	0.00321	0.00044
Tolsta Head	0	267.4	71513.7	0.797	1.255	0.00000	0.00000
Tom Loch Bacavat	70	274.8	75539.1	0.802	1.248	0.00036	0.00005
Tory Island	2156	128.8	16594.0	0.666	1.503	0.06121	0.00838
Tulm Island	0	198.0	39200.0	0.756	1.322	0.00000	0.00000
Vaternish Point to Waterfall	190	178.8	31982.4	0.752	1.329	0.00248	0.00034
Waterfall to Ard Beag	0	176.4	31106.3	0.749	1.335	0.00000	0.00000
Waterstein Head to Camas na h Annait	0	155.6	24204.0	0.732	1.366	0.00000	0.00000
Wiay	0	146.7	21510.0	0.715	1.399	0.00000	0.00000
Sum	**86106**		**5528493.1**		**204.783**	**7.30406**	**1.00000**

*Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

Guillemot

Table 45: Guillemot breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding guillemot as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
North Colonsay and Western Cliffs SPA	33793	38.9	1513.7	0.664	1.507	0.50442	0.40797
Rathlin Island SPA	152095	89.1	7933.5	0.567	1.764	0.50700	0.41006
Sheep Island SPA	942	89.0	7919.9	0.549	1.820	0.00325	0.00263
Treshnish Isles SPA	19781	54.1	2932.2	0.688	1.453	0.14692	0.11883
Carrick-a-rede	239	90.2	8139.7	0.546	1.833	0.00081	0.00065
Carrickaveol	16	82.4	6792.8	0.598	1.672	0.00006	0.00005
Ceann a Mhara	3899	51.1	2608.5	0.865	1.157	0.02592	0.02097
Coul Point	75	27.8	772.4	0.726	1.378	0.00201	0.00162
Croaghdoo	8	87.8	7704.8	0.538	1.860	0.00003	0.00002
Eagamol	402	95.1	9048.4	0.602	1.662	0.00111	0.00090
Eilean nan Each	161	95.4	9102.2	0.598	1.672	0.00044	0.00036
Esky Bay	214	82.6	6829.5	0.616	1.623	0.00076	0.00062
Glac Na Criche SSSI	78	25.1	629.7	0.729	1.372	0.00254	0.00205
Glengad Head	28	86.3	7442.3	0.571	1.751	0.00010	0.00008
Islay 11	40	54.5	2973.9	0.692	1.446	0.00029	0.00024
Islay 53	757	34.3	1173.3	0.718	1.392	0.01347	0.01089
Islay 54	0	34.9	1215.3	0.718	1.393	0.00000	0.00000
Islay-Texa	15	68.2	4648.5	0.672	1.487	0.00007	0.00006
Larribane 2	126	90.2	8143.2	0.545	1.834	0.00043	0.00034

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Muck B	78	93.0	8646.3	0.594	1.685	0.00023	0.00018
Muck D	0	94.1	8859.3	0.579	1.727	0.00000	0.00000
Muck E	54	95.6	9143.5	0.580	1.724	0.00015	0.00012
Muck f	0	95.2	9057.3	0.595	1.679	0.00000	0.00000
Pigs Paradise 7	756	29.1	847.8	0.693	1.443	0.01929	0.01560
Rathlin Sound 4	8	92.3	8514.8	0.541	1.848	0.00003	0.00002
Reidh Eilean	3	38.5	1482.5	0.729	1.372	0.00004	0.00003
Smaull Farm RSPB	78	25.1	629.7	0.729	1.372	0.00254	0.00205
Stac Mhic Mhurchaidh	230	38.2	1460.6	0.731	1.369	0.00324	0.00262
Staffa	0	50.5	2555.1	0.668	1.497	0.00000	0.00000
The Oa RSPB	170	53.5	2860.7	0.692	1.445	0.00129	0.00104
Sum	**214046**		**151581.4**		**47.236**	**1.23641**	**1.00000**

* Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

Razorbill

Table 46: Razorbill breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding razorbill as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Mingulay and Berneray SPA	17718	105.0	11028.1	0.903	1.108	0.10568	0.10515
Rathlin Island SPA	33632	89.1	7933.7	0.516	1.939	0.48802	0.48553
Canna and Sanday SPA	900	116.8	13641.5	0.664	1.506	0.00590	0.00587
North Colonsay and Western Cliffs SPA	3081	38.9	1515.2	0.636	1.572	0.18986	0.18889
Rum SPA	450	110.6	12234.4	0.601	1.663	0.00363	0.00361
Sheep Island SPA	332	89.0	7917.5	0.518	1.929	0.00480	0.00477
Treshnish Isles SPA	1913	54.1	2930.8	0.655	1.526	0.05915	0.05884
Carrick-a-rede	147	90.2	8131.1	0.516	1.939	0.00208	0.00207
Carrickaveol	9	82.4	6795.7	0.612	1.633	0.00013	0.00013
Ceann a Mhara	645	51.1	2615.2	0.797	1.255	0.01838	0.01828
Coul Point	131	27.8	771.2	0.669	1.495	0.01503	0.01495
Craigaig	0	96.1	9239.2	0.482	2.077	0.00000	0.00000
Dunaff Head	6	96.9	9387.9	0.625	1.601	0.00006	0.00006
Eagamol	56	95.1	9046.3	0.583	1.715	0.00062	0.00062
Eilean An Naiomh NW Cliffs	0	57.8	3337.8	0.544	1.837	0.00000	0.00000
Eilean Beag	0	61.4	3764.4	0.526	1.900	0.00000	0.00000
Eilean Mor	0	60.4	3653.5	0.531	1.885	0.00000	0.00000
Eilean nan Each	60	95.4	9109.3	0.580	1.723	0.00067	0.00067
Esky Bay	195	82.7	6832.9	0.626	1.597	0.00271	0.00269

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Garb Eileach NW Cliffs	2	61.1	3731.1	0.531	1.885	0.00005	0.00004
Glac Na Criche SSSI	68	25.0	626.4	0.675	1.482	0.00948	0.00943
Glengad Head	9	86.3	7443.1	0.595	1.680	0.00012	0.00012
Islay 10 (East)	5	55.7	3100.7	0.593	1.688	0.00015	0.00014
Islay 11	177	54.5	2969.5	0.596	1.677	0.00594	0.00590
Islay 12	0	53.5	2862.3	0.599	1.670	0.00000	0.00000
Islay 12	0	36.3	1316.5	1.615	0.619	0.00000	0.00000
Islay 53	192	34.2	1169.2	0.657	1.522	0.01485	0.01477
Islay 54	0	34.8	1209.7	0.656	1.525	0.00000	0.00000
Islay-Texa	38	68.1	4644.2	0.568	1.761	0.00084	0.00084
Larribane 2	66	90.2	8140.7	0.516	1.939	0.00093	0.00093
Little Skerries	0	89.4	7985.8	0.532	1.879	0.00000	0.00000
Muck B	21	93.0	8655.3	0.576	1.735	0.00025	0.00025
Muck D	0	94.2	8865.8	0.565	1.769	0.00000	0.00000
Muck E	0	95.6	9141.0	0.566	1.766	0.00000	0.00000
Muck f	0	95.2	9064.3	0.578	1.729	0.00000	0.00000
Mull 66	6	67.1	4508.0	0.614	1.629	0.00013	0.00013
Mull of Kintyre 1	0	104.5	10930.2	0.478	2.092	0.00000	0.00000
Pabbay	8	107.9	11649.3	0.895	1.118	0.00004	0.00004
Pigs Paradise 7	393	29.1	849.1	0.655	1.526	0.04195	0.04174
Rathlin Sound 1	9	90.2	8139.7	0.516	1.939	0.00013	0.00013
Rathlin Sound 1A	8	91.0	8286.2	0.514	1.946	0.00010	0.00010
Rathlin Sound 2	0	91.0	8286.2	0.514	1.946	0.00000	0.00000
Rathlin Sound 3	8	91.6	8393.4	0.512	1.952	0.00010	0.00010
Rathlin Sound 4	204	92.2	8504.4	0.511	1.956	0.00279	0.00277

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2 (km^2)	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Rathlin Sound 5	101	92.2	8503.0	0.511	1.957	0.00137	0.00137
Rathlin Sound 6	0	93.0	8655.5	0.509	1.965	0.00000	0.00000
Reidh Eilean	60	38.5	1484.9	0.688	1.453	0.00349	0.00347
Sanda Islands	645	116.1	13476.2	0.463	2.158	0.00613	0.00610
Smaull Farm RSPB	92	25.0	626.4	0.675	1.482	0.01286	0.01279
Stac Mhic Mhurchaidh	36	38.2	1459.4	0.690	1.450	0.00212	0.00211
Staffa	0	50.6	2557.7	0.641	1.560	0.00000	0.00000
The Oa RSPB	132	53.5	2858.7	0.598	1.672	0.00459	0.00456
Uamh Ropa	0	96.7	9356.1	0.481	2.078	0.00000	0.00000
Sum	**61548**		**329335.7**		**90.105**	**1.00513**	**1.00000**

* Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/ (sum(1/proportional areas))).

Puffin

Table 47: Puffin breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding puffin as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Canna and Sanday SPA	9926	116.8	13638.2	0.662	1.510	0.03327	0.05210
Flannan Isles SPA	98944	260.0	67583.7	0.851	1.175	0.05211	0.08159
Mingulay and Berneray SPA	4642	105.0	11021.9	0.725	1.380	0.01760	0.02755
Rathlin Island SPA	2348	89.1	7933.5	0.508	1.969	0.01765	0.02763
Shiant Isles SPA	129390	214.2	45890.9	0.743	1.346	0.11495	0.17999
St Kilda SPA	197586	232.0	53808.5	0.887	1.127	0.12531	0.19621
Tory Island SPA	114	128.6	16549.4	0.665	1.503	0.00031	0.00049
Ailsa Craig SPA	250	144.7	20951.0	0.455	2.200	0.00079	0.00124
Copeland Islands SPA	212	167.8	28147.6	0.424	2.357	0.00054	0.00084
Inishtrahull Island SPA	12	74.5	5555.3	0.589	1.696	0.00011	0.00017
North Colonsay and Western Cliffs SPA	0	38.9	1513.7	0.544	1.839	0.00000	0.00000
Rum SPA	0	110.6	12232.3	0.642	1.558	0.00000	0.00000
Sheep Island SPA	4	89.0	7919.9	0.513	1.947	0.00003	0.00005
Treshnish Isles SPA	13040	54.1	2932.2	0.587	1.704	0.22952	0.35938
An t-Iasgair Group	414	193.6	37476.8	0.729	1.372	0.00046	0.00072
Bohesian	N/A	89.3	7976.2	0.514	1.945	0.00000	0.00000
Ceann a Mhara	0	51.1	2608.5	0.622	1.607	0.00000	0.00000
Coppay	0	203.5	41422.1	0.790	1.266	0.00000	0.00000

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Eagamol	38	95.1	9048.4	0.617	1.620	0.00021	0.00032
Eilean Beag	0	61.4	3769.5	0.524	1.908	0.00000	0.00000
Eilean Creagach	200	184.9	34195.0	0.728	1.373	0.00024	0.00038
Eilean Mor	0	60.4	3652.5	0.525	1.906	0.00000	0.00000
Eilean nan Each	100	95.4	9102.2	0.617	1.620	0.00054	0.00084
Eilean Trodday	0	202.8	41119.7	0.726	1.378	0.00000	0.00000
Fladda Chuain to Gearran Island	752	197.9	39164.0	0.734	1.362	0.00079	0.00124
Gasker - Tysties	50	222.1	49313.0	0.808	1.237	0.00004	0.00006
Glen Maye - Peel	16	242.3	58717.3	0.350	2.856	0.00002	0.00004
Gob Uisgebrigh	30	195.1	38056.1	0.715	1.399	0.00003	0.00005
Gobbins	108	145.6	21200.8	0.447	2.236	0.00034	0.00054
Haskeir	4	196.7	38703.4	0.818	1.223	0.00000	0.00001
Haskeir Eagach Islets	0	195.9	38366.3	0.819	1.221	0.00000	0.00000
Horn Head 1 Spa	N/A	120.3	14467.0	0.639	1.565	0.00000	0.00000
Horn Head 2	N/A	120.3	14467.0	0.639	1.565	0.00000	0.00000
Horn Head 3	N/A	121.2	14696.7	0.641	1.561	0.00000	0.00000
Horn Head 4	N/A	120.9	14627.8	0.642	1.558	0.00000	0.00000
Horn Head 5	N/A	120.9	14615.9	0.643	1.556	0.00000	0.00000
Horn Head 6	N/A	122.4	14977.9	0.643	1.554	0.00000	0.00000
Horn Head 7	N/A	122.7	15052.7	0.644	1.552	0.00000	0.00000
Meikle Ross	0	252.9	63945.0	0.409	2.444	0.00000	0.00000
Muck E	N/A	95.6	9143.5	0.614	1.628	0.00000	0.00000
Muck f	N/A	95.2	9057.3	0.616	1.622	0.00000	0.00000
Muck Island	2	145.3	21114.9	0.447	2.236	0.00001	0.00001
Mull Of Galloway RSPB	0	198.4	39358.3	0.401	2.492	0.00000	0.00000

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Pabbay	6	107.9	11634.4	0.725	1.380	0.00002	0.00003
Port St Mary - Sound	N/A	257.1	66112.9	0.340	2.944	0.00000	0.00000
Ramsey - Port Mooar	N/A	249.5	62261.9	0.364	2.749	0.00000	0.00000
Sanda Islands	108	116.1	13489.6	0.473	2.114	0.00051	0.00080
Stac Mhic Mhurchaidh	278	38.2	1460.6	0.579	1.727	0.00996	0.01559
Staffa	1622	50.5	2555.1	0.577	1.732	0.03329	0.05213
The Oa RSPB	0	53.5	2860.7	0.530	1.885	0.00000	0.00000
Toralaydan	N/A	193.7	37515.9	0.676	1.480	0.00000	0.00000
Tormore - Spa	N/A	191.1	36528.3	0.676	1.479	0.00000	0.00000
Sum	**460196**		**1249513.0**		**89.665**	**0.63866**	**1.00000**

* Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).

Fulmar

Table 48: Fulmar breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA. Yellow highlighted SPAs include breeding fulmar as a qualifying feature.

SPA*	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight**	Proportional apportioning weight
Beara Peninsula SPA	1290	596.3	355604.5	0.804	1.244	0.00133	0.00044
Blasket Islands SPA	3768	538.3	289735.1	0.824	1.213	0.00464	0.00154
Buchan Ness to Collieston Coast SPA	2264	599.1	358893.5	0.675	1.482	0.00275	0.00091
Calf of Eday SPA	4576	473.7	224360.2	0.718	1.394	0.00837	0.00277
Cape Wrath SPA	2122	327.9	107514.0	0.753	1.328	0.00771	0.00255
Clare Island SPA	5294	352.1	123950.7	0.849	1.178	0.01481	0.00490
Cliffs of Moher SPA	9602	460.3	211835.4	0.821	1.219	0.01626	0.00538
Copinsay SPA	2468	467.4	218431.8	0.710	1.408	0.00468	0.00155
Deenish Island and Scariff Island SPA	802	582.3	339034.2	0.808	1.237	0.00086	0.00029
Dingle Peninsula SPA	1704	518.1	268468.8	0.822	1.216	0.00227	0.00075
Duvillaun Islands SPA	1094	313.4	98240.9	0.853	1.173	0.00384	0.00127
East Caithness Cliffs SPA	20654	487.7	237830.4	0.711	1.406	0.03594	0.01190
Fair Isle SPA	64982	544.1	296014.2	0.708	1.412	0.09123	0.03022
Fetlar SPA	18354	659.5	434944.6	0.715	1.398	0.01737	0.00575
Flamborough and Filey Coast SPA	1598	974.0	948615.9	0.584	1.713	0.00085	0.00028
Flannan Isles SPA	6132	260.0	67588.8	0.812	1.232	0.03289	0.01089
Foula SPA	20506	559.4	312925.6	0.724	1.382	0.02666	0.00883

SPA*	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight**	Proportional apportioning weight
Fowlsheugh SPA	978	657.0	431673.6	0.676	1.479	0.00099	0.00033
Handa SPA	1730	293.6	86226.8	0.757	1.322	0.00780	0.00258
Hermaness, Saxa Vord and Valla Field SPA	26416	660.6	436402.8	0.717	1.394	0.02484	0.00823
High Island, Inishshark and Davillaun SPA	3122	367.4	135012.6	0.852	1.174	0.00799	0.00265
Horn Head to Fanad Head SPA	1316	125.8	15836.6	0.803	1.245	0.03046	0.01009
Hoy SPA	38744	422.6	178581.3	0.721	1.388	0.08861	0.02935
Iveragh Penninsula SPA	2060	558.0	311349.8	0.816	1.226	0.00239	0.00079
Kerry Head SPA	602	501.8	251833.6	0.817	1.224	0.00086	0.00029
Lambay Island SPA	544	307.5	94551.7	0.737	1.357	0.00230	0.00076
Mingulay and Berneray SPA	10160	105.0	11028.1	0.798	1.253	0.33969	0.11250
North Caithness Cliffs SPA	31044	417.0	173924.8	0.717	1.394	0.07325	0.02426
North Rona and Sula Sgeir SPA	4420	355.0	126024.1	0.783	1.277	0.01318	0.00437
Noss SPA	8694	611.9	374405.5	0.710	1.408	0.00962	0.00319
Puffin Island SPA (ROI)	1438	565.7	320008.0	0.815	1.227	0.00162	0.00054
Rathlin Island SPA	2076	89.1	7933.7	0.765	1.308	0.10072	0.03336
Rousay SPA	4384	456.7	208608.1	0.721	1.387	0.00858	0.00284
Saltee Islands SPA	714	472.9	223637.5	0.719	1.392	0.00131	0.00043
Shiant Isles SPA	3012	214.2	45881.6	0.788	1.269	0.02452	0.00812
Skelligs SPA	1518	572.3	327527.3	0.816	1.226	0.00167	0.00055
St Kilda SPA	41424	232.0	53824.0	0.827	1.209	0.27394	0.09073
Sumburgh Head SPA	11900	578.3	334430.9	0.709	1.411	0.01477	0.00489
Tory Island SPA	1312	128.6	16550.3	0.807	1.239	0.02889	0.00957

SPA*	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight**	Proportional apportioning weight
Troup, Pennan and Lion's Heads SPA	2550	553.5	306411.7	0.686	1.459	0.00357	0.00118
West Donegal Coast SPA	2964	201.0	36526.3	0.818	1.222	0.02919	0.00967
West Westray SPA	2198	457.6	209417.3	0.724	1.381	0.00427	0.00141
Aberdaron Coast and Bardsey Island SPA	50	387.7	150278.3	0.685	1.460	0.00014	0.00005
Ailsa Craig SPA	156	144.7	20934.3	0.736	1.358	0.00298	0.00099
Auskerry SPA	396	481.7	232000.7	0.711	1.406	0.00071	0.00023
Canna and Sanday SPA	32	116.8	13645.3	0.776	1.289	0.00089	0.00029
Copeland Islands SPA	32	167.8	28141.0	0.745	1.342	0.00045	0.00015
Coquet Island SPA	104	829.0	687159.9	0.642	1.558	0.00007	0.00002
Farne Islands SPA	366	797.2	635585.2	0.649	1.540	0.00026	0.00009
Firth of Forth SPA	10	762.0	580675.5	0.677	1.477	0.00001	0.00000
Forth Islands SPA	1312	741.4	549705.3	0.677	1.476	0.00104	0.00034
Inishtrahull Island SPA	194	74.5	5555.3	0.788	1.269	0.01304	0.00432
Inner Moray Firth SPA	4	596.3	355612.8	0.726	1.377	0.00000	0.00000
Isles of Scilly SPA	272	701.8	492562.3	0.663	1.508	0.00025	0.00008
Lindisfarne SPA	0	790.7	625135.7	0.655	1.526	0.00000	0.00000
Marwick Head SPA	1018	431.5	186200.4	0.726	1.378	0.00222	0.00073
Monach Isles SPA	78	177.5	31503.8	0.805	1.242	0.00091	0.00030
Mousa SPA	316	593.6	352410.4	0.710	1.408	0.00037	0.00012
North Colonsay and Western Cliffs SPA	852	38.8	1508.4	0.763	1.311	0.21787	0.07216
Papa Stour SPA	3112	589.8	347874.7	0.722	1.386	0.00365	0.00121
Papa Westray (North Hill and Holm) SPA	512	471.0	221825.5	0.723	1.383	0.00094	0.00031
Pentland Firth Islands SPA	954	436.6	190622.3	0.714	1.401	0.00206	0.00068
Priest Island SPA	0	246.1	60581.4	0.759	1.318	0.00000	0.00000

SPA*	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight**	Proportional apportioning weight
Puffin Island SPA	22	348.5	121437.9	0.675	1.481	0.00008	0.00003
Ramna Stacks and Gruney SPA	142	631.2	398384.9	0.720	1.388	0.00015	0.00005
Rum SPA	42	110.6	12230.4	0.770	1.299	0.00131	0.00043
Sheep Island SPA	122	89.0	7917.5	0.767	1.303	0.00591	0.00196
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	1372	516.5	266772.3	0.673	1.486	0.00225	0.00074
St Abb's Head to Fast Castle SPA	456	764.3	584154.5	0.667	1.500	0.00034	0.00011
Sule Skerry and Sule Stack SPA	238	384.5	147840.3	0.748	1.336	0.00063	0.00021
The Wash SPA	182	1115.5	1244417.8	0.547	1.829	0.00008	0.00003
Treshnish Isles SPA	566	54.1	2930.8	0.770	1.299	0.07385	0.02446
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	78	610.3	372446.9	0.676	1.480	0.00009	0.00003
All Non-SPA colonies	281102		649198245.7		3304.254	1.31931	0.43695
Sum	**666622**		**667737893.6**		**3403.573**	**3.01934**	**1.00000**

*Apportioning weightings are presented for SPAs only. Apportioning weightings for non-SPA fulmar colonies are not presented (except for a summary of all non-SPAs) due to the large volume of information, but these can be provided upon request.

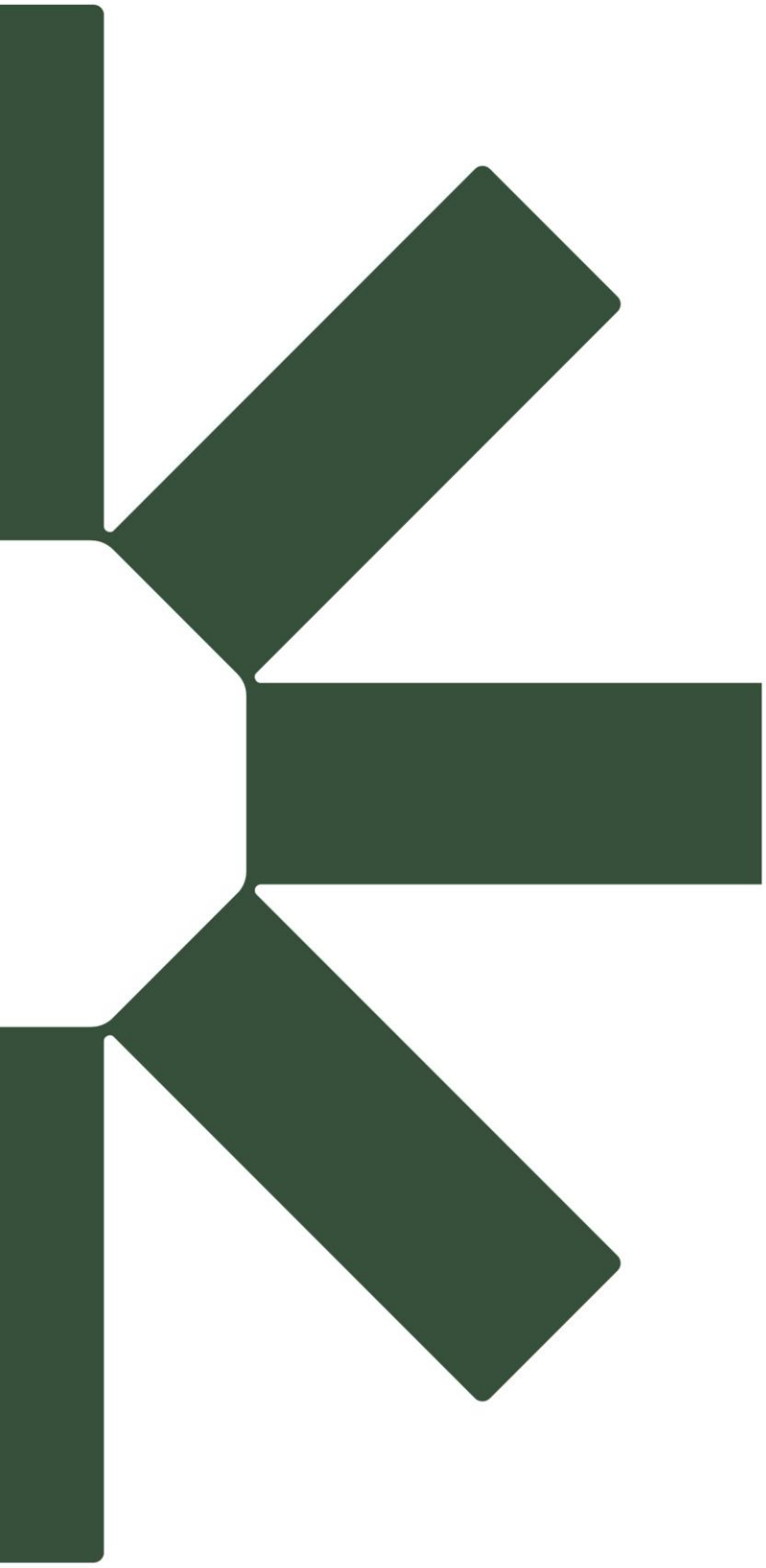
** Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/ (sum(1/proportional areas))).

Gannet

Table 49: Gannet breeding season apportioning rates for the Project. Most recent counts are from Seabirds Count (Burnell et al., 2023) or Seabird Monitoring Programme[7] where updated counts are available. Distance is shortest 'at-sea' distance between the geometric centre of the WDA and the geometric centre of the SPA or non-SPA colony. Yellow highlighted SPAs include breeding gannet as a qualifying feature.

SPA/Non-SPA colony	Most recent count (Adult Individuals)	Distance from centre of WDA to centre of colony (km)	Distance^2	Sea proportion of foraging range	Inverse sea proportion	Absolute weight*	Proportional apportioning weight
Ailsa Craig SPA	61930	144.7	20934.3	0.656	1.524	1.37421	0.55287
Grassholm SPA	34090	496.8	246787.9	0.624	1.603	0.06748	0.02715
North Rona and Sula Sgeir SPA	18990	355.0	126024.1	0.882	1.134	0.05209	0.02096
Saltee Islands SPA	9444	472.9	223637.5	0.663	1.508	0.01942	0.00781
St Kilda SPA	118410	232.0	53820.9	0.836	1.196	0.80188	0.32261
Sule Skerry and Sule Stack SPA	15648	384.5	147806.0	0.880	1.137	0.03668	0.01476
Big Scar	5102	209.2	43758.1	0.621	1.611	0.05724	0.02303
Clare Island SPA	704	352.1	123950.7	0.802	1.246	0.00216	0.00087
Flannan Isles SPA	10560	260.0	67588.8	0.849	1.177	0.05607	0.02256
Ireland's Eye SPA	700	317.7	100910.4	0.637	1.571	0.00332	0.00134
Lambay Island SPA	1852	307.5	94551.7	0.634	1.576	0.00941	0.00379
Marwick Head SPA	58	431.5	186200.4	0.881	1.136	0.00011	0.00004
Mingulay and Berneray SPA	16	105.0	11028.1	0.777	1.288	0.00057	0.00023
Rockall	56	235.4	55432.9	0.838	1.193	0.00037	0.00015
West Westray SPA	2772	457.6	209417.3	0.883	1.133	0.00457	0.00184
Sum	**280332**		**1711849.2**		**20.032**	**2.48559**	**1.00000**

* Absolute weight = (most recent count /sum(most recent counts)) x ((sum distances)^2 / distance^2) x (1/proportional area/(sum(1/proportional areas))).



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