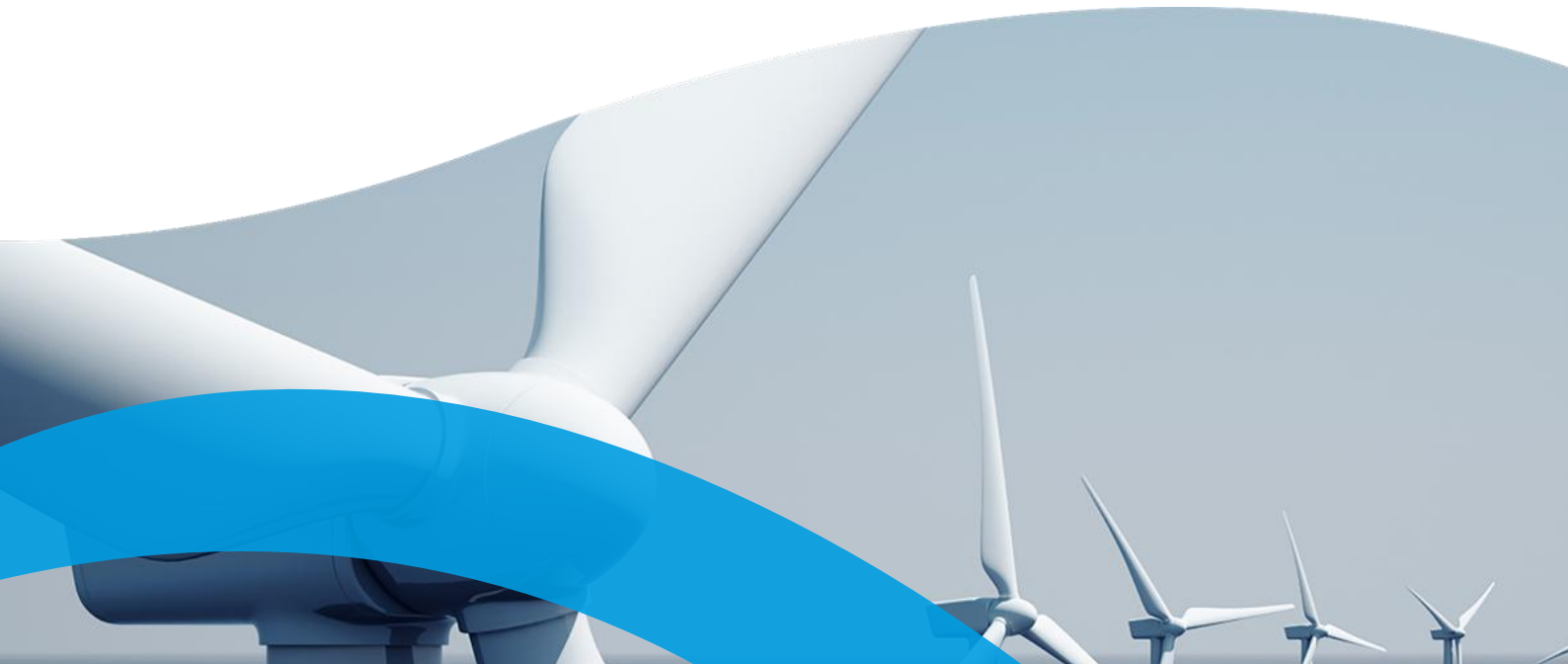
Muir Mhòr Offshore Wind Farm

Environmental Impact Assessment Report

Volume 3, Appendix 11.4: Offshore Ornithology Apportioning Report



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Muir Mhòr Offshore Wind Farm

Offshore Ornithology Apportioning Report (Volume 3, Appendix 11.4)

5 November 2024

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Contents

1. Introduction 6
2. Methodology 7
   - 2.1. Species Screening 7
   - 2.2. Population Counts 10
   - 2.3. Seasonal definitions 13
   - 2.4. Apportioning Calculation 14
3. Results 16
   - 3.1. Breeding Season Apportioning Factors 16
   - 3.2. Non-Breeding Season Apportioning Factors 17
   - 3.3. Apportioned Impact Estimates 22
4. References 35
5. Annexes 36

A. Non-SPA Colonies' Apportioning Inputs 36

B. Non- SPA Colonies' Breeding Season Apportioning Factors and Estimated Impact 45

Glossary

Term	Definition
Array Area	The area in which the generation infrastructure (including Wind Turbine Generators and associated foundations, and inter-array cables) and Offshore Electrical Platforms will be located.
Apportion	To distribute or allocate proportionally.
Apportioning factor	The correction factor calculated for each colony representing the proportion of the total impact that colony is estimated to receive.
Connectivity with the development	A colony within species-specific foraging range of the nearest edge of a development Array Area, when travelling by sea.
Developer	Muir Mhòr Offshore Wind Farm.
Proposed Development	The offshore Muir Mhor Offshore Wind Farm project elements to which this Offshore EIA Report relates.

Acronyms

Acronym	Definition
AA	Array Area
AOB	Apparently Occupied Burrows
AON	Apparently Occupied Nests
AOT	Apparently Occupied Territories
BDMPS	Biologically Defined Minimum Population Scales
BTO	British Trust for Ornithology
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HRA	Habitats
IND	Individual(s)
MHWS	Mean High Water Springs
PVA	Population Viability Analysis
RSPB	Royal Society for the Protection of Birds
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area

Species names

Common name	Scientific name	British Trust Ornithology (BTO) Code
Kittiwake	*Rissa tridactyla*	KI
Common gull	*Larus canus*	CM
Great black-backed gull	*Larus marinus*	GB
Herring gull	*Larus argentatus*	HG
Common tern	*Sterna hirundo*	CN
Arctic tern	*Sterna paradisaea*	AE
Guillemot	*Uria aalge*	GU
Razorbill	*Alca torda*	RA
Puffin	*Fratercula arctica*	PU
Red-throated diver	*Gavia stellata*	RH
Fulmar	*Fulmarus glacialis*	F.
Manx shearwater	*Puffinus puffinus*	MX
Gannet	*Morus bassanus*	GX

List of Tables

Table 2.1: Displacement rates and mortality rate ranges to be used in impact assessments, from NatureScot (2023a). 7

Table 2.2: Summarised collision and displacement impact results. Collision results are those from Scenario 1 of collision risk modelling as this represents both the most likely and worst-case scenario, these results can be found in Offshore Ornithology Collision Risk Modelling (CRM) Report (Volume 3, Appendix 11.2, Table 3.1). Displacement results are the limits of the range of estimates presented in the Offshore Ornithology Distributional Response Report (Volume 3, Appendix 11.3, Table 3.2). Results given in individual birds and 95% confidence intervals are presented in brackets where available. Numbers are rounded to two decimal places for table formatting only. 8

Table 2.3: The species for which apportioning was carried out and their foraging ranges as advised in NatureScot (2023b). 10

Table 2.4: SPAs, for which the listed species are a feature or assemblage feature, used in the apportioning calculations for each species, along with their by sea, centroid to centroid, distances from the AA, the number of individual breeding adults in the SPA and the year count data were collected. That of non-SPA colonies are presented in Annex A. 11

Table 2.5: Seasonal definitions used to apportion impacts per season. The breeding season represents the breeding season as defined by NatureScot (2020). All other periods are from Furness (2015) and have been foreshortened where they overlap with the breeding season. 14

Table 3.1: The calculated impact apportioning factor for each relevant SPA for each species and the total sum of each species' relevant non-SPA colonies. '-' s are presented where the species and SPA combination is not relevant, either due to no connectivity with the AA, or the species not being a feature of the SPA. Values are rounded to 3 decimal places for display purposes only. 16

Table 3.2: The number of kittiwake adults and immatures each SPA contributes to the regional UK North Sea BDMPS population during the non-Breeding period; autumn migration. Along with the proportion of the regional UK North Sea BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given. 17

Table 3.3: The number of kittiwake adults and immatures each SPA contributes to the regional UK North Sea BDMPS population during the non-Breeding period; spring migration. Along with the proportion of the regional UK North Sea BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given. 18

Table 3.4: The number of razorbill adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during both the non-Breeding periods; Autumn and Spring migration seperately. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given. 20

Table 3.5: The number of razorbill adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; over-winter. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.....20

Table 3.6: The number of gannet adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; autumn migration. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given. 21

Table 3.7: The number of gannet adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; spring migration. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given. 21

Table 3.8: Total guillemot upper and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only. 22

Table 3.9: Total razorbill upper displacement estimate seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only. 23

Table 3.10: Total razorbill lower displacement estimate seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only. 23

Table 3.11: Total puffin breeding season lower and upper displacement estimates apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only. 23

Table 3.12: Total estimated herring gull collision impact seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only. 24

Table 3.13: Total kittiwake collision and upper displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only. 25

Table 3.14: Total kittiwake collision and and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only. 27

Table 3.15: Total gannet collision and upper displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only. 30

Table 3.16: Total gannet collision and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only. 32

Table 5.1: All non- SPA Kittiwake populations within 300.6 km by sea of the nearest edge of the AA, and their count size in individual breeding adults. 36

Table 5.2: All non-SPA Herring Gull populations within 85.6 km by sea of the nearest edge of the AA, and their count size in individual breeding adults. 40

Table 5.3: All non- SPA guillemot populations within 95.2 km by sea of the nearest edge of the AA, and their count size in individual breeding adults. 40

Table 5.4: All non- SPA Razorbill populations within 122.2 km by sea of the nearest edge of the AA, and their count size in individual breeding adults. 41

Table 5.5: All non- SPA Puffin populations within 265.4 km by sea of the nearest edge the AA, and their count size in individual breeding adults. All puffin counts are sourced from Burnell et al. (2023) so the count year is not given. 42

Table 5.6: All non-SPA gannet populations within 509.4 km by sea of the nearest edge of the AA, and their count size in individual breeding adults. 44

Table 5.7: Total estimated breeding season kittiwake collision and both upper and lower displacement impacts seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2. 45

Table 5.8: Total estimated herring gull collision impact seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. 50

Table 5.9: Total estimated guillemot displacement uper and lower estimates seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. 51

Table 5.10: Total estimated razorbill breeding season upper and lower displacement estimates seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2. 52

Table 5.11: Total estimated puffin breeding season upper and lower displacement estimates apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. 53

Table 5.12: Total estimated breeding season gannet collision and both upper and lower displacement impacts seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2. 55

1. Introduction

Muir Mhòr Offshore Wind Farm Limited (hereafter referred to as 'the Developer') is proposing to develop the Muir Mhòr Offshore Wind Farm (hereafter 'the Project'). The Project is made up of both offshore and onshore components. The subject of this offshore Environmental Impact Assessment Report (EIAR) is the offshore infrastructure of the Project seaward of Mean High-Water Springs (MHWS) which is hereafter referred to as 'the Proposed Development'.

Apportioning provides a means of estimating the proportion of total impact, arising from a development, expected to be received by each individual colony with connectivity to that development. Predicted impacts of a development can be assigned to colonies by calculating apportioning factors as a function of their population size, distance from a development's Array Area (AA) and the amount of the colony's foraging range that falls within open sea. For each colony, the calculated apportioning factor can then be multiplied by the total precited impact to estimate the proportion of that impact which will be experienced by birds from that colony. Thus, the sum of each colonies apportioned impacts will equal the total predicted impact. This technical appendix presents the methodology used to seasonally apportion the predicted collision and/or distributional response impacts of the Proposed Development. Apportioning factors were calculated for puffin, kittiwake, guillemot, herring gull, gannet and razorbill. Only these species were carried forward to apportioning, based on their estimated level of impacts (as estimated in Volume 3, Appendix 11.3 (Offshore Ornithology Distributional Responses Report) and Volume 3, Appendix 11.2 (Offshore Ornithology Collision Risk Modelling (CRM) Report)). Such apportioning of impacts allows the total estimated collision and distributional response impacts on seabirds to be proportionally divided amongst the Special Protection Areas (SPAs) and non-SPA colonies the Proposed Development is predicted to affect. Apportioning of impacts to each colony facilitates assessment of the potential effects of the Proposed Development on the site integrity of SPAs and non-SPA colonies and informs the Environmental Impact Assessment (EIA), Habitats Regulations Appraisal (HRA) and which species require Population Viability Analysis (PVA).

The predicted impacts from distributional responses and collision are summarised below and estimated in the Offshore Ornithology Distributional Responses Report (Volume 3, Appendix 11.3) and Volume 3, Appendix 11.2 (Offshore Ornithology Collision Risk Modelling (CRM) Report)), respectively. The apportioning methods used in this technical appendix follow the approach set out in NatureScot's interim guidance note (NatureScot, 2018). This determines theoretical connectivity between seabird populations and the AA based on species-specific foraging ranges and a distance decay model (NatureScot, 2018). Impacts are separately apportioned to all colonies during the breeding season and the non-breeding season.

2. Methodology

2.1. Species Screening

Species included in apportioning were screened based on the level of impact predicted. As such, the species for which apportioning factors were calculated were determined by the results of the collision risk modelling and displacement assessment, the details of which can be found in the relevant technical appendices Volume 3, Appendix 11.3 (Offshore Ornithology Distributional Responses Report) and Volume 3, Appendix 11.2 (Offshore Ornithology Collision Risk Modelling (CRM) Report). The guidance on displacement assessments, discussed in NatureScot (2023a) and detailed in Statutory Nature Conservation Bodies (SNCB) (2022), advises that a range of displacement values are carried forward to the assessment of population impacts. Table 2.1 comes from the NatureScot guidance on distributional responses (NatureScot 2023a) and shows the range of mortality rates which should be used in displacement assessments during both the breeding and non-breeding seasons.

Table 2.1: Displacement rates and mortality rate ranges to be used in impact assessments, from NatureScot (2023a).

Species	Displacement rate	Mortality rate (breeding season)	Mortality rate (non-breeding season)
Guillemot, razorbill and puffin	60%	3% and 5%	1% and 3%
Gannet	70%	1% and 3%	1% and 3%
Kittiwake	30%	1% and 3%	1% and 3%

For all species, both the breeding and non-breeding season each have a higher and lower displacement estimate because of the range of rates applied for mortality. As such, two separate displacement scenarios are apportioned here:

1. The upper displacement estimate comprised of the higher breeding and higher non-breeding season estimates.

2. The lower displacement estimate comprised of the lower breeding and lower non-breeding season estimates.

For example, apportioning of the upper displacement estimate for puffin would use the breeding season displacement results calculated using a mortality rate of 5% and the non-breeding season using 3%; and the lower displacement estimate would use the breeding season displacement results calculated using a mortality rate of 3% and the non-breeding season using 1%.

The impacts predicted for all species are summarised in Table 2.2. Where a range of displacement estimates are recommended by NatureScot (2023a) both the upper and lower displacement estimates are presented. For all other species in Table 2.2, only one displacement estimate was calculated per season apart from Manx shearwater. The Manx shearwater displacement estimate presented in Table 2.2 is the highest calculated for that species being derived from a displacement rate of 70% and mortality rate of 10%.

Table 2.2: **Summarised collision and displacement impact results. Collision results are those from Scenario 1 of collision risk modelling as this represents both the most likely and worst-case scenario, these results can be found in Offshore Ornithology Collision Risk Modelling (CRM) Report (Volume 3, Appendix 11.2, Table 3.1). Displacement results are the limits of the range of estimates from displacement matrices presented in the Offshore Ornithology Distributional Response Report (Volume 3, Appendix 11.3, Table 3.1). Results given in individual birds and 95% confidence intervals are presented in brackets where available. Numbers are rounded to two decimal places for table formatting only.**

Species	Impact	Breeding season	Autumn migration	Spring migration	Over winter
Kittiwake	Collision	61.73 (12.10 – 1.2e+02)	0.95 (0.35 – 2.05)	8.35 (4.89 – 13.53)	-
	Displacement (upper)	29.27	0.52	6.76	-
	Displacement (lower)	9.76	0.17	2.25	
Common gull	Collision	0.00 (0.00 – 2.165)	-	-	-
Great black-backed gull	Collision	0.00 (0.00 – 1.7e+30)	-	-	17.42 (2.02 – 5.0e+28)
Herring gull	Collision	0.854 (0.022 – 3.8e+272)	-	-	1.73 (0.02 – 1.2e+29)
Common tern	Collision	0.00 (0.00 – 0.691)	-	-	-
Arctic tern	Collision	0.23 (0.00 – 2.41)	-	-	-
	Displacement	4.41	0.00	-	0.00
Guillemot	Displacement (upper)	393.67	-	-	213.53
	Displacement (lower)	236.20			71.18
Razorbill	Displacement (upper)	46.46	24.99	2.1	0.75
	Displacement (lower)	27.88	8.33	0.7	0.25
Puffin	Displacement (upper)	54.36	-	-	32.62

Species	Impact	Breeding season	Autumn migration	Spring migration	Over winter
	Displacement (lower)	32.62			10.87
Red-throated diver	Displacement	0.07	0.00	0.00	-
Fulmar	Collision	0.35 (0.00 – 15.47)	-	-	0.07 (0.00 – 9.07)
Manx shearwater	Displacement	0.7	-	-	-
Gannet	Collision	9.59 (2.09 – 38.58)	2.31 (0.30 – 14.71)	0.46 (0.00 – 1.75)	-
	Displacement (upper)	12.55	12.45	1.56	-
	Displacement (lower)	4.18	4.15	0.52	

Of the species the Proposed Development is predicted to impact (Table 2.2), the following were screened out of impact apportioning:

- **Arctic tern** which has a relatively low total estimated impact of 4.643 birds all of which occurs in the breeding season. Breeding season apportioning would be based on the recommended foraging range of 40.5 km (NatureScot, 2023b); however, the nearest Arctic tern population is over 79 km from the nearest part of the AA. Therefore, apportioning was not required.
- **Common gull** as the estimated impact is 0.
- **Common tern** as the estimated impact is 0.
- **Great black-backed gull** which has an estimated impact of 17.422 birds, all of which occurs in the non-breeding season. Non-breeding season apportioning is based on the regional population estimates published by Furness (2015) the appropriate one of which is 91,399 individuals, of these 28,663 are estimated to be UK birds (Furness, 2015). Thus, the apportioning of these 17.422 impacted birds would lead to 5.46 ((28,663/91,399)* 17.422) mortalities being apportioned to UK birds and less than 0.001 to birds with breeding season connectivity to the AA. Furthermore, these numbers are in “all birds” rather than breeding adults.
- **Manx shearwater’s** estimated impact of 0.7 birds would be insignificant when apportioned to all colonies in the Manx shearwater range of 2365.5 km.
- **Fulmar** as the estimated breeding season impact of 0.345 birds would be insignificant when apportioned to all colonies in the fulmar range of 1200.2 km. As would the non-breeding seasons impacts of 0.502 and 0.07 birds in the respective regional populations of 957,502 and 568,736.
- **Red-throated diver** as the total estimated impact of 0.07 birds, all of which occurs in the breeding season, would be insignificant and, like Arctic tern, was not apportioned as the recommended foraging range is 9 km, yet the nearest part of the AA is approximately 64 km from land.

Impact apportioning was carried out for all the remaining species for which impacts were estimated, these species are summarised in Table 2.3. For each of these species, all colonies expected to be impacted were identified. A colony to which impact is expected, is one with connectivity to a development. As per NatureScot guidance (NatureScot, 2018), a colony is classed as having connectivity to a development if the shortest distance between a development and a colony, when travelling by sea only, is equal to or less than that species' recommended foraging range. To take account of the possibility that displacement impacts may occur up to 4 km from the AA, connectivity was assessed to the nearest edge of the AA plus 4 km buffer to the nearest edge of an SPA. As non-SPA colonies are only spatially represented by a point, their connectivity was measured from the nearest edge of the AA 4 km buffer to the colony point. Each species' foraging range is that recommended by NatureScot (2023b), derived from those published by Woodward *et al,* (2019) and represent the mean maximum foraging range of the species plus one standard deviation. The foraging ranges used are presented in Table 2.3.

In the foraging range guidance (NatureScot 2023b), some colonies/SPAs have unique foraging ranges derived from the maximum published by Woodward *et al,* (2019) (as opposed to their mean maximum plus one standard deviation) which can result in them being impacted if their unique range has connectivity. This is the case for the gannet populations at St Kilda SPA and Forth Islands SPA having a foraging range of 709 km and 590 km respectively.

Table 2.3: The species for which apportioning was carried out and their foraging ranges as advised in NatureScot (2023b).

Common name	Foraging range (km)
Kittiwake	300.6
Herring Gull	85.6
Guillemot	95.2
Razorbill	122.2
Puffin	265.4
Gannet	509.4
Gannet (St Kilda SPA only)	709.0
Gannet (Forth Islands SPA only)	590.0

2.2. Population Counts

2.2.1. Breeding season

Following the screening of species and identification of their colonies with connectivity to the AA, the most recent count data for these colonies were sourced. The majority of these data were obtained from "Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015–2021)" (Burnell *et al*., 2023). However, where more recent counts were present on the SMP database (Seabird Monitoring Programme, 2024), these were used instead, except in the case of puffin counts. In the majority of cases, puffin counts on SMP do not match the same counts also present in the most recent census (Burnell *et al*., 2023) as they are in different units. For example, the count of puffins at Fair Isle SPA detailed in the most recent census (Burnell *et al*., 2023) is a count of 6666 Apparently Occupied Burrows (AOB) in 2015. On SMP a count of 6666 puffins at Fair Isle SPA is also recorded in 2015, however the units are given as Individuals (IND). As a result of these common mismatches between the two sources puffin counts were only obtained from the most recent census (Burnell *et al*., 2023) and were not updated with more recent counts where they were present on SMP as they were most often given in IND.

The population size for a given species at an SPA is comprised of the sum of all colonies within that SPA boundary containing that species. In some instances, a colony forming part of an SPA had a more recent count available on SMP than in Burnell *et al.* (2023) in which case the most recent count of each colony within the SPA was summed to obtain the population size of the SPA. While the focus of apportioning impacts is often on the predicted impact to SPAs, the accurate apportioning to all relevant colonies is essential as the proportion of impact attributed to non-SPA colonies directly effects the proportion available to be attributed to SPAs.

Once the most recent count data was obtained for each relevant colony, these numbers were corrected to represent individual birds depending on their count unit. Counts recorded in AOB, "Apparently Occupied Nests" (AON), "Apparently Occupied Sites" (AOS) and "Apparently Occupied Territories" (AOT) were multiplied by 2 as they are assumed to represent a pair of breeding adults. For guillemot and razorbill colony size measurements are typically made by counting the number of individuals present at any given time. To estimate the number of breeding guillemot and razorbill from these individual counts, a correction factor of 1.34 was applied as derived from Harris (1989) and applied by other projects (Berwick Bank, 2022). On occasions where guillemot and razorbill counts were provided in AON/AOS, these were first doubled to be converted to individuals and then multiplied by 1.34 as was done by Berwick Bank (2022).

The final count (in individuals) for each relevant species and SPA combination, the year(s) of this count and the distance from the SPA to the AA are presented in Table 2.4, that of all non-SPA colonies are presented in Annex A. The distance presented here, and used in the apportioning calculation, is different from the nearest edge to nearest edge distance used in the screening of Section 2.1. In the apportioning calculation, the shortest by-sea distance between the centroid of the SPA and the centroid of the AA is used as per NatureScot guidance (NatureScot, 2018). These final apportioning counts represent a count of breeding adults.

Table 2.4: SPAs, for which the listed species are a feature or assemblage feature, used in the apportioning calculations for each species, along with their by sea, centroid to centroid, distances from the AA, the number of individual breeding adults in the SPA and the year count data were collected. That of non-SPA colonies are presented in Annex A.

SPA	Species	Distance to AA (km)	Count (breeding adults)	Year(s) of Count
Buchan Ness to Collieston Coast	Kittiwake	76.08	27094	2023**
	Herring Gull		4536	2023**
	Guillemot		40763	2023**
Calf of Eday	Kittiwake	239.14	672	2016-2018*
Cape Wrath	Kittiwake	313.76	7244	2017*
Copinsay	Kittiwake	206.5	592	2023**
Coquet Island	Puffin	239.59	50058	2019*
East Caithness Cliffs	Kittiwake	188.47	48958	2015-2018*
Fair Isle	Kittiwake	243.23	896	2021*
	Puffin		13332	2015*
	Gannet		9654	2023**
Farne Islands	Kittiwake	209.48	7166	2023*
	Puffin		87504	2019*
Flamborough and Filey Coast	Gannet	362.97	30466	2023**

SPA	Species	Distance to AA (km)	Count (breeding adults)	Year(s) of Count
Forth Islands	Kittiwake	199.04	13244	2021-2023***
	Puffin		90291	2017-2023***
	Gannet		150518	2014*
Foula	Kittiwake	315.61	850	2021*
Fowlsheugh	Kittiwake	112.45	30966	2018-2023***
	Razorbill		20870	2023**
Hermaness, Saxa Vord and Valla Field	Gannet	386.89	59124	2021*
Hoy	Kittiwake	228.8	532	2016*
	Puffin		860	2016-2017*
Marwick Head	Kittiwake	255.05	2878	2023**
North Caithness Cliffs	Kittiwake	219.61	11142	2015-2016*
	Puffin		5438	2015-2023***
North Rona and Sula Sgeir	Gannet	378.2	18990	2023**
Noss	Kittiwake	304.4	172	2023**
	Gannet		24670	2023**
Rousay	Kittiwake	247.98	660	2016-2021***
St Kilda	Gannet	545.3	120580	2013*
St Abb's Head to Fast Castle	Kittiwake	193.63	9158	2023**
Sule Skerry and Sule Stack	Gannet	293.97	18130	2018*
Sumburgh Head	Kittiwake	274.94	1932	2017-2021*
Troup, Pennan and Lion's Heads	Kittiwake	107.56	27344	2021-2023***
	Guillemot		47719	2023**
	Razorbill		8801	2023**
West Westray	Kittiwake	255.47	4838	2017-2023***

** Count from Burnell et al., (2023)*

***More recent count than Burnell et al., (2023) for all colonies in SPA taken from SMP*

**** More recent count than Burnell et al., (2023) for 1 or more colonies in SPA taken from SMP, but not all.*

2.2.2. Non-breeding season

Non-breeding season apportioning was carried out as was advised by NatureScot during scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)). For all species in Table 2.3, except guillemot and herring gull (details of how non-breeding season apportioning was carried out for guillemot, herring gull and all other species in Table 2.3 are provided in Section 2.4.2), individuals are expected to disperse from their colonies during the non-breeding season, no longer following central place foraging theory. This dispersal (and in some cases, an influx of birds from other regions), means apportioning was carried out in relation to the spatially distinct, Biologically Defined Minimum Population Scales (BDMPS) published in Furness (2015). In each distinct spatial area, these BDMPS provide a total population estimate of each species during their non-breeding periods, along with the number of adults and immatures (separately) from UK SPAs contributing to this regional BDMPS population. The proportion of an SPA's population contributing to each regional BDMPS population is estimated by Furness (2015) based on published literature and is carried out over the same spatial scale as the BDMPS. For example, in the case of kittiwake during the Autumn migration period, Furness (2015) estimates 60% of the adult population of each UK North Sea SPA contributes to the 'UK North Sea waters' BDMPS population. Thus, from the individuals each SPA contributes relative to the total BDMPS population, the proportion of non-breeding season impact to be apportioned to each SPA can be estimated.

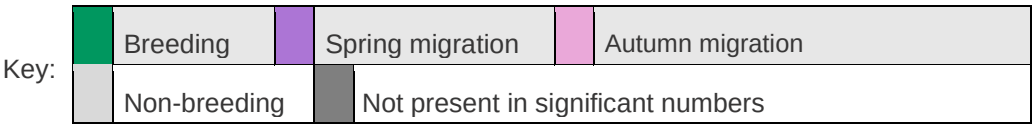
2.3. Seasonal definitions

Each species' breeding season is that detailed in NatureScot (2020) as "Breeding period (strongly associated with nest site)". As per the scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)) NatureScot confirmed that, in the definitions given in NatureScot (2020), the period of breeding site attendance, during which birds are in attendance of the nest site but not closely associated with it, constitutes part of the non-breeding season not the breeding season. Apportioning of non-breeding season impacts to SPAs requires the use of regional population estimates published by Furness (2015). These regional population estimates relate to species-specific periods within the non-breeding season. As a result, non-breeding season impacts must be estimated within the levels of non-breeding periods presented in Furness (2015) to facilitate their accurate apportioning. Thus, while each species' non-breeding season can be defined as the inverse of their breeding season, this non-breeding season itself may contain further classification(s), referred to here as non-breeding sub periods. These non-breeding periods are summarised in Table 2.5.

For certain species, one or more of the non-breeding seasons in Furness (2015) extend into the breeding season detailed in NatureScot (2020). For example, the spring migration period of kittiwake is reported as spanning January-April by Furness (2015), however, the breeding season begins in mid-April in NatureScot (2020). In these circumstances, the non-breeding season(s) were foreshortened according to the breeding season as advised by NatureScot in their scoping response (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)).

Table 2.5: Seasonal definitions used to apportion impacts per season. The breeding season represents the breeding season as defined by NatureScot (2020). All other periods are from Furness (2015) and have been foreshortened where they overlap with the breeding season.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kittiwake												
Herring gull												
Guillemot												
Razorbill												
Puffin												
Gannet												



Some seasonal definitions include 'half months' i.e. the break between the seasons occurs in the middle of a month rather than the end. Following scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)), NatureScot advised that impacts estimated during these 'half-months' be allocated equally to each season with a proportion of 0.5 to follow the approach used by Berwick Bank (2022).

For guillemot and herring gull, the month of March does not fall into either the breeding season as defined by NatureScot (2020), or the non-breeding season as defined by Furness (2015). It has however been included as part of the non-breeding seasons as, during scoping consultation, NatureScot advised to follow the approach used by Berwick Bank (2022) (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)).

2.4. Apportioning Calculation

2.4.1. Breeding Season

To obtain the breeding season apportioning factors for each species' colonies, a weighting was calculated for each colony as a function of the population size, distance from the AA and the proportion of the colonies' foraging range which is at sea. This provides a higher weight to colonies that are closer, have larger populations and a smaller proportion of their foraging range at sea. The at-sea proportion of foraging area was calculated by creating a polygon of total potential foraging area around the colony centroid equal to the relevant species' foraging range and then removing all which overlapped with land. The proportion at sea was then the amount of area remaining compared to the area of the total potential foraging area. This proportion at sea was then combined with the distances and population sizes (Table 2.4) of each species separately in the calculation below to obtain a weighting for each SPA and non-SPA colony. This calculation is visualised in Equation 1.

$$Weight = \left(\frac{Colony\ population}{\sum\ populations}\right) \times \left(\frac{\sum Distances^2}{Colony\ Distance^2}\right) \times \left(\frac{\left(\frac{1}{SPA\ Sea\ Proportion}\right)}{\left(\sum \frac{1}{SPA\ Sea\ Proportions}\right)}\right)$$

Equation 1: The calculation used to obtain a weighting for each population, within each species, as advised by NatureScot (2018).

Finally, the proportion of impacts to be apportioned to each SPA and non-SPA colony was calculated by dividing the weight of each by the sum of all the weights for each species. Thus, for each species, giving a proportion out of 1 of the estimated impacts that should be attributed to each SPA and non-SPA colony. Within each species, the sum of all the apportioning factors of both the SPAs and non-SPA colonies was 1. The resulting apportioning factors, along with the apportioned, estimated collision and displacement impact(s) are presented in Section 3.

2.4.2. Non-breeding Season

The proportion of impacts, estimated to occur in the non-breeding season, attributable to each SPA is calculated as the proportion of birds from that SPA in the regional BDMPS population. This approach to non-breeding season apportioning was advised by NatureScot during scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)) and is based on the work of Furness (2015). Non-breeding season apportioning was only carried out to all species-specific SPAs with breeding season connectivity to the AA, as opposed to all SPAs in that BDMPS region. This assumes non-breeding season impact alone is of little concern to any UK SPA not scoped into breeding season assessment. Non-SPA colonies were only apportioned to as a whole during the non-breeding season as this is the resolution presented in Furness (2015).

For each species and SPA combination, an apportioning factor was separately calculated for each of the non-breeding periods which make up that species' non-breeding season (as defined by Furness (2015)) and was carried out for both adults and immatures separately. This was calculated by dividing the number of birds from each relevant SPA which contribute to the regional BDMPS population by the total regional BDMPS population. This approach to non-breeding season apportioning was adopted for all apportioned species, except guillemot and herring gull.

As advised by NatureScot during scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)), impacts predicted for guillemot in the non-breeding season were apportioned using the same approach detailed for the breeding season. Whilst this approach is conservative in terms of the number of SPAs considered, use of the wider BDMPS may underestimate effects on regional SPAs given that this species does not disperse widely in the non-breeding season (Buckingham *et al*., 2022).

Similarly, herring gull are also not expected to disperse far during the non-breeding season and were apportioned using the breeding season population. However, unlike guillemot, a significant influx of Western UK and overseas herring gull are expected to contribute to the regional non-breeding season herring gull population. As such, a correction factor to account for this influx was calculated using ratios derived from Furness (2015) as follows. As per Furness (2015), herring gull have one non-breeding period, over-winter. The applicable herring gull BDMPS region from Furness (2015) for the Proposed Development is 'UK North Sea & Channel waters' which was reported as having a total over winter population of 466,511 birds. Of these, 135,130 are reported as coming from overseas and 16,521 from the Western UK resulting in 151,651 out of 466,511 giving a proportion of 0.325. In the absence of updated numbers, this proportion is assumed to still be representative. Thus, non-breeding season apportioning of herring gull was carried out as per the breeding season, however, was then multiplied by 0.675 (1 - 0.325) to proportionally exclude those birds arriving from overseas and the Western UK over winter.

Conversely, during the non-breeding season, puffin are expected to disperse widely from the breeding season region (Furness, 2015). As such, non-breeding season apportioning was not carried out for puffin as advised by NatureScot during scoping consultation (Offshore and Intertidal Ornithology EIA Report (Volume 2, Chapter 12, Table 12-2)).

3. Results

The calculated breeding and non-breeding season apportioning factors are first presented, followed by the seasonally apportioned collision and/or displacement estimates for each species.

3.1. Breeding Season Apportioning Factors

The proportion of estimated impacts to be attributed to SPAs with connectivity to the AA are presented in Table 3.1, as are the sum of all non-SPA colonies. The individual apportioning factors for each non-SPA colony are presented in Annex B.

Table 3.1: The calculated breeding season impact apportioning factor for each relevant SPA for each species and the total sum of each species' relevant non-SPA colonies. '-' s are presented where the species and SPA combination is not relevant, either due to no connectivity with the AA, or the species not being a feature of the SPA. Values are rounded to 3 decimal places for display purposes only.

SPA	HG	GU	RA	PU	KI	GX
Buchan Ness to Collieston Coast	0.977	0.607	-	-	0.330	-
Troup, Pennan and Lion's Heads	-	0.368	0.174	-	0.164	-
Fowlsheugh	-	-	0.422	-	0.185	-
Calf of Eday	-	-	-	-	0.001	-
Copinsay	-	-	-	-	0.001	-
Coquet Island	-	-	-	0.151	-	-
East Caithness Cliffs	-	-	-	-	0.091	-
Fair Isle	-	-	-	0.025	0.001	0.022
Farne Islands	-	-	-	0.340	0.013	-
Forth Islands	-	-	-	0.413	0.028	0.621
Hoy	-	-	-	0.002	0.001	-
Marwick Head	-	-	-	-	0.003	-
North Caithness Cliffs	-	-	-	0.015	0.015	-
Rousay	-	-	-	-	0.001	-
Sumburgh Head	-	-	-	-	0.001	-
West Westray	-	-	-	-	0.004	-
Cape Wrath	-	-	-	-	0.005	-
Foula	-	-	-	-	0.000	-
Noss	-	-	-	-	0.000	0.035
St Abb's Head to Fast Castle	-	-	-	-	0.021	-
Sule Skerry and Sule Stack	-	-	-	-	-	0.029
Flamborough and Filey Coast	-	-	-	-	-	0.040
Hermaness, Saxa Vord and Valla Field	-	-	-	-	-	0.050
North Rona and Sula Sgeir	-	-	-	-	-	0.018
St Kilda	-	-	-	-	-	0.057
All non-SPA colonies	0.023	0.025	0.405	0.054	0.137	0.129

3.2. Non-Breeding Season Apportioning Factors

3.2.1. Kittiwake

The kittiwake BDMPS region relevant to the Proposed Development is the 'UK North Sea' BDMPS which has an estimated 829,937 individuals during their 'Autumn migration period' and 627,816 during their Spring (Furness, 2015). The number of birds (adults and immatures separately) each SPA contributes to this regional population during kittiwake's 'Autumn migration period' and 'Spring migration period' are presented in Table 3.2 and Table 3.3 respectively. The proportions these represent are also presented there and define that SPA's impact apportioning factor for that period. These numbers were obtained from Appendix A of Furness (2015).

Table 3.2: The number of kittiwake adults and immatures each SPA contributes to the regional UK North Sea BDMPS population during the non-Breeding period; autumn migration. Along with the proportion of the regional UK North Sea BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.

Colony / SPA name	UK North Sea adults associated with the SPA	UK North Sea immatures associated with the SPA	UK North Sea total birds	Proportion adults	Proportion immatures
St Abb's Head to Fast Castle	4084	2396	829937	0.005	0.003
Fowlsheugh	11204	6573	829937	0.013	0.008
Forth Islands	3720	2182	829937	0.004	0.003
Farne Islands	4132	2424	829937	0.005	0.003
Buchan Ness to Collieston Coast	15050	8830	829937	0.018	0.011
Troup, Pennan and Lion's Heads	17875	10487	829937	0.022	0.013
East Caithness Cliffs	48492	28449	829937	0.058	0.034
Copinsay	799	469	829937	0.001	0.001
North Caithness Cliffs	12180	7146	829937	0.015	0.009
Hoy	476	279	829937	0.001	0.000
West Westray	14466	8487	829937	0.017	0.010
Rousay	2117	1242	829937	0.003	0.001
Calf of Eday	896	526	829937	0.001	0.001
Fair Isle	925	543	829937	0.001	0.001
Marwick head	631	370	829937	0.001	0.000
Sumburgh Head	252	148	829937	0.000	0.000
Cape Wrath	207	910	829937	0.000	0.001

Colony / SPA name	UK North Sea adults associated with the SPA	UK North Sea immatures associated with the SPA	UK North Sea total birds	Proportion adults	Proportion immatures
Foula	392	230	829937	0.000	0.000
Noss	608	357	829937	0.001	0.000
UK North Sea non-SPA total	84000	49280	829937	0.101	0.059

Source: Furness 2015

Table 3.3: **The number of kittiwake adults and immatures each SPA contributes to the regional UK North Sea BDMPS population during the non-Breeding period; spring migration. Along with the proportion of the regional UK North Sea BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.**

Colony / SPA name	UK North Sea adults associated with the SPA	UK North Sea immatures associated with the SPA	UK North Sea total birds	Proportion adults	Proportion immatures
St Abb's Head to Fast Castle	4084	1797	627816	0.007	0.003
Fowlsheugh	11204	4930	627816	0.018	0.008
Forth Islands	3720	1637	627816	0.006	0.003
Farne Islands	4132	1818	627816	0.007	0.003
Buchan Ness to Collieston Coast	15050	6622	627816	0.024	0.011
Troup, Pennan and Lion's Heads	17875	7865	627816	0.028	0.013
East Caithness Cliffs	48492	21336	627816	0.077	0.034
Copinsay	799	352	627816	0.001	0.001
North Caithness Cliffs	12180	5359	627816	0.019	0.009
Hoy	476	210	627816	0.001	0.000
West Westray	14466	6365	627816	0.023	0.010
Rousay	2117	931	627816	0.003	0.001
Calf of Eday	896	394	627816	0.001	0.001
Fair Isle	925	407	627816	0.001	0.001
Marwick head	631	278	627816	0.001	0.000
Sumburgh Head	252	111	627816	0.000	0.000

Colony / SPA name	UK North Sea adults associated with the SPA	UK North Sea immatures associated with the SPA	UK North Sea total birds	Proportion adults	Proportion immatures
Cape Wrath	207	364	627816	0.000	0.001
Foula	392	173	627816	0.001	0.000
Noss	608	268	627816	0.001	0.000
UK North Sea non-SPA total	84000	36960	627816	0.134	0.059

Source: Furness 2015

3.2.2. Herring Gull

Herring gull non-breeding season apportioning was carried out as per the breeding season but with a correction factor of 0.675 applied to account for an influx of birds to the regional population during the non-breeding season, as discussed in Section 2.4.2.

3.2.3. Guillemot

Guillemot non-breeding season apportioning was carried out as per the breeding season, as discussed in Section 2.4.2, thus the apportioning factors are the same as those presented for guillemot during the breeding season in Table 3.1.

3.2.4. Razorbill

The Razorbill BDMPS region relevant to the Proposed Development is the 'UK North Sea & Channel waters' BDMPS which has an estimated 591,874 individuals during both their 'Autumn and Spring migration periods' separately and 218,622 during their 'over-winter period' (Furness, 2015). The number of birds (adults and immatures separately) each SPA contributes to this regional population during razorbill's 'Autumn and Spring migration periods' and 'over-winter period' are presented in Table 3.4 and Table 3.5 respectively. The proportions these represent are also presented and define that SPA's impact apportioning factor for that period. These numbers were obtained from Appendix A of Furness (2015).

Table 3.4: **The number of razorbill adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during both the non-Breeding periods; Autumn and Spring migration separately. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.**

Colony / SPA name	UK North Sea & Channel adults associated with the SPA	UK North Sea & Channel immatures associated with the SPA	UK North Sea & Channel total birds	Proportion adults	Proportion immatures
Fowlsheugh	7048	4757	591874	0.012	0.008
Troup, Pennan and Lion's Heads	3486	2353	591874	0.006	0.004
UK North Sea non-SPAs	20000	13500	591874	0.034	0.023

Source: Furness 2015

Table 3.5: **The number of razorbill adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; over-winter. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.**

Colony / SPA name	UK North Sea & Channel adults associated with the SPA	UK North Sea & Channel immatures associated with the SPA	UK North Sea & Channel total birds	Proportion adults	Proportion immatures
Fowlsheugh	2114	529	218622	0.010	0.002
Troup, Pennan and Lion's Heads	1064	261	218622	0.005	0.001
UK North Sea non-SPAs	6000	1500	218622	0.027	0.007

Source: Furness 2015

3.2.5. Puffin

Non-breeding season apportioning was not carried out for puffin.

3.2.6. Gannet

The gannet BDMPS region relevant to the Proposed Development is the 'UK North Sea & Channel waters' BDMPS which has an estimated 456,298 individuals during their 'Autumn migration period' and 248,385 during their Spring (Furness, 2015). The number of birds (adults and immatures separately) each SPA contributes to this regional population during gannet's 'Autumn migration period' and 'Spring migration period' are presented in Table 3.6 and Table 3.7 respectively. The proportions these represent are also presented there and define that SPA's impact apportioning factor for that period. These numbers were obtained from Appendix A of Furness (2015).

Table 3.6: The number of gannet adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; autumn migration. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.

Colony / SPA name	UK North Sea & Channel adults associated with the SPA	UK North Sea & Channel immatures associated with the SPA	UK North Sea & Channel total birds	Proportion adults	Proportion immatures
Hermaness, Saxavord	38965	31561	456,298	0.085	0.069
Noss	15627	12658	456,298	0.034	0.028
Fair Isle	6278	5086	456,298	0.014	0.011
Forth Islands	110964	80893	456,298	0.243	0.177
Flamborough and Filey	22122	16127	456,298	0.048	0.035
Sule Skerry and Sule Stack	935	1515	456,298	0.002	0.003
North Rona and Sula Sgeir	1845	2989	456,298	0.004	0.007
St Kilda	11924	19318	456,298	0.026	0.042
UK North Sea non-SPA total	12000	8748	456,298	0.026	0.019

Source: Furness 2015

Table 3.7: The number of gannet adults and immatures each SPA contributes to the regional UK North Sea & Channel waters BDMPS population during the non-Breeding period; spring migration. Along with the proportion of the regional UK North Sea & Channel waters BDMPS population this equates to. The residual sum attributed of all non-SPA colonies summed is also given.

Colony / SPA name	UK North Sea & Channel adults associated with the SPA	UK North Sea & Channel immatures associated with the SPA	UK North Sea & Channel total birds	Proportion adults	Proportion immatures
Hermaness, Saxavord	34094	15781	248,385	0.137	0.064
Noss	13674	6329	248,385	0.055	0.025
Fair Isle	5494	2543	248,385	0.022	0.01
Forth Islands	77675	35952	248,385	0.313	0.145
Flamborough and Filey	15485	7168	248,385	0.062	0.029
Sule Skerry and Sule Stack	0	0	248,385	0	0

Colony / SPA name	UK North Sea & Channel adults associated with the SPA	UK North Sea & Channel immatures associated with the SPA	UK North Sea & Channel total birds	Proportion adults	Proportion immatures
North Rona and Sula Sgeir	0	0	248,385	0	0
St Kilda	0	0	248,385	0	0
UK North Sea non-SPA total	8400	3888	248,385	0.034	0.016

Source: Furness 2015

3.3. Apportioned Impact Estimates

3.3.1. Displacement Impacts

The apportioned displacement impacts to all species which are estimated to be impacted by displacement alone are presented below.

3.3.1.1. Guillemot

The guillemot apportioning factors were applied separately to the total upper and lower displacement estimates (Table 2.2) predicted to affect guillemot during their breeding and non-breeding season. The resulting impact apportioned to each SPA along with the sum of all non-SPA colonies is presented in Table 3.8. That of all non-SPA colonies are presented in Annex B.

Table 3.8: Total guillemot upper and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only.

	Breeding season		Over-winter period	
Colony / SPA name	Upper estimate	Lower estimate	Upper estimate	Lower estimate
Troup, Pennan and Lion's Heads	144.794	86.876	78.538	26.180
Buchan Ness to Collieston Coast	239.063	143.437	129.670	43.225
Non-SPA colonies	9.813	5.888	5.323	1.774

3.3.1.2. Razorbill

The razorbill apportioning factors (Table 3.1, Table 3.44 and Table 3.55) were applied to the total upper and lower displacement estimates separately (Table 2.2) predicted to affect razorbill during their breeding and non-breeding season. The resulting impact apportioned to each SPA along with the sum of all non-SPA colonies using the upper displacement estimate is presented in Table 3.9, and using the lower displacement estimate in Table 3.10. Impacts apportioned to individual non-SPA colonies are presented in Annex B.

Table 3.9: **Total razorbill upper displacement estimate seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only.**

Colony / SPA name	Breeding season	Autumn Migration		Spring Migration		Over-winter	
		Adults	Immatures	Adults	Immatures	Adults	Immatures
Troup, Pennan and Lion's Heads	8.078	0.150	0.100	0.013	0.008	0.004	0.001
Fowlsheugh	19.584	0.300	0.200	0.025	0.017	0.008	0.002
Non-SPA colonies	18.798	0.850	0.575	0.071	0.048	0.020	0.005

Table 3.10: **Total razorbill lower displacement estimate seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only.**

Colony / SPA name	Breeding season	Autumn Migration		Spring Migration		Over-winter	
		Adults	Immatures	Adults	Immatures	Adults	Immatures
Troup, Pennan and Lion's Heads	4.847	0.050	0.033	0.004	0.003	0.001	0.000
Fowlsheugh	11.752	0.100	0.067	0.008	0.006	0.003	0.001
Non-SPA colonies	11.280	0.283	0.192	0.024	0.016	0.007	0.002

3.3.1.3. Puffin

The puffin apportioning factors (Table 3.1) were applied to the total upper and lower displacement estimates separately (Table 2.2) predicted to affect puffin during their breeding season. Non-breeding season impacts were not apportioned for puffin. The resulting impact apportioned to each SPA along with the sum of all non-SPA colonies is presented in Table 3.11.That of all non-SPA colonies are presented in Annex B.

Table 3.11: **Total puffin breeding season lower and upper displacement estimates apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Values are rounded to 3 decimal places for display purposes only.**

Colony / SPA name	Upper displacement estimate	Lower displacement estimate
Fair Isle	1.337	0.802
North Caithness Cliffs	0.792	0.475
Coquet Island	8.228	4.937
Farne Islands	18.497	11.099
Forth Islands	22.468	13.482
Hoy	0.112	0.067
Non-SPA colonies	2.926	1.756

3.3.2. Collision Impacts

The apportioned collision impacts to all species which are estimated to be impacted by collision alone are presented below.

3.3.2.4. Herring Gull

The herring gull apportioning factors (Table 3.1) were applied to the total collision impact (Table 2.2) predicted to affect herring gull during their breeding season and were multiplied by 0.675 before being applied to that for the non-breeding season. The resulting impact apportioned to each SPA along with the sum of all non-SPA colonies is presented in Table 3.12, that of all non-SPA colonies is presented in Annex B.

Table 3.12: Total estimated herring gull collision impact seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only.

Colony / SPA name	Breeding season	Over-Winter Period
Buchan Ness to Collieston Coast	0.834 (0.021-3.712E+272)	1.139 (0.011-7.91E+286)
Non-SPA colonies	0.020 (0.001-9E+270)	0.027 (0.000-1.9E+285)

3.3.3. Displacement and Collision Impacts

The apportioned collision impacts to all species which are estimated to be impacted by both collision and displacement are presented below.

3.3.3.5. Kittiwake

The kittiwake apportioning factors (Table 3.1, Table 3.2 and Table 3.3) were applied to the collision impact and each of the upper and lower displacement estimates (Table 2.2) predicted to affect kittiwake during their breeding and non-breeding season. The resulting impacts apportioned to each SPA along with the sum of all non-SPA colonies are presented below. Table 3.13 provides the apportioned collision and upper displacement estimate while Table 3.14 provides the apportioned collision and lower displacement estimate. That of all non-SPA colonies is presented in Annex B.

Table 3.13: Total kittiwake collision and upper displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only.

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact	Displacement impact	Collision impact		Displacement impact		Collision impact		Displacement impact	
			Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Buchan Ness to Collieston Coast	20.357 (3.988-39.571)	9.652	0.017 (0.006-0.037)	0.01 (0.004-0.023)	0.009	0.006	0.2 (0.117-0.325)	0.092 (0.054-0.149)	0.162	0.074
Calf of Eday	0.043 (0.008-0.083)	0.020	0.001 (0-0.002)	0.001 (0-0.002)	0.001	0.001	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.007	0.007
Cape Wrath	0.288 (0.056-0.56)	0.137	0 (0-0)	0.001 (0-0.002)	0.000	0.001	0 (0-0)	0.008 (0.005-0.014)	0.000	0.007
Copinsay	0.052 (0.01-0.102)	0.025	0.001 (0-0.002)	0.001 (0-0.002)	0.001	0.001	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.007	0.007
East Caithness Cliffs	5.596 (1.096-10.878)	2.653	0.055 (0.02-0.119)	0.032 (0.012-0.07)	0.030	0.018	0.643 (0.376-1.042)	0.284 (0.166-0.46)	0.521	0.230
Fair Isle	0.052 (0.01-0.101)	0.025	0.001 (0-0.002)	0.001 (0-0.002)	0.001	0.001	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.007	0.007
Farne Islands	0.831 (0.163-1.616)	0.394	0.005 (0.002-0.01)	0.003 (0.001-0.006)	0.003	0.002	0.058 (0.034-0.095)	0.025 (0.015-0.041)	0.047	0.020
Forth Islands	1.75 (0.343-3.401)	0.830	0.004 (0.001-0.008)	0.003 (0.001-0.006)	0.002	0.002	0.05 (0.029-0.081)	0.025 (0.015-0.041)	0.041	0.020
Foula	0.028 (0.005-0.055)	0.013	0 (0-0)	0 (0-0)	0.000	0.000	0.008 (0.005-0.014)	0 (0-0)	0.007	0.000

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact	Displacement impact	Collision impact		Displacement impact		Collision impact		Displacement impact	
			Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Fowlsheugh	11.418 (2.237-22.196)	5.414	0.012 (0.004-0.027)	0.008 (0.003-0.016)	0.007	0.004	0.15 (0.088-0.243)	0.067 (0.039-0.108)	0.122	0.054
Hoy	0.039 (0.008-0.076)	0.018	0.001 (0-0.002)	0 (0-0)	0.001	0.000	0.008 (0.005-0.014)	0 (0-0)	0.007	0.000
Marwick Head	0.165 (0.032-0.321)	0.078	0.001 (0-0.002)	0 (0-0)	0.001	0.000	0.008 (0.005-0.014)	0 (0-0)	0.007	0.000
North Caithness Cliffs	0.901 (0.177-1.752)	0.427	0.014 (0.005-0.031)	0.009 (0.003-0.018)	0.008	0.005	0.159 (0.093-0.257)	0.075 (0.044-0.122)	0.128	0.061
Noss	0.006 (0.001-0.012)	0.003	0.001 (0-0.002)	0 (0-0)	0.001	0.000	0.008 (0.005-0.014)	0 (0-0)	0.007	0.000
Rousay	0.04 (0.008-0.077)	0.019	0.003 (0.001-0.006)	0.001 (0-0.002)	0.002	0.001	0.025 (0.015-0.041)	0.008 (0.005-0.014)	0.020	0.007
St Abb's Head to Fast Castle	1.268 (0.248-2.464)	0.601	0.005 (0.002-0.01)	0.003 (0.001-0.006)	0.003	0.002	0.058 (0.034-0.095)	0.025 (0.015-0.041)	0.047	0.020
Sumburgh Head	0.085 (0.017-0.165)	0.040	0 (0-0)	0 (0-0)	0.000	0.000	0 (0-0)	0 (0-0)	0.000	0.000
Troup, Pennan and Lion's Heads	10.094 (1.978-19.622)	4.786	0.021 (0.008-0.045)	0.012 (0.004-0.027)	0.011	0.007	0.234 (0.137-0.379)	0.108 (0.064-0.176)	0.189	0.088
West Westray	0.27 (0.053-0.526)	0.128	0.016 (0.006-0.035)	0.009 (0.003-0.021)	0.009	0.005	0.192 (0.112-0.311)	0.083 (0.049-0.135)	0.155	0.068

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact	Displacement impact	Collision impact		Displacement impact		Collision impact		Displacement impact	
			Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Non-SPA colonies	8.449 (1.655-16.423)	4.006	0.095 (0.035-0.207)	0.056 (0.02-0.121)	0.053	0.031	1.118 (0.655-1.812)	0.492 (0.288-0.798)	0.906	0.399

Table 3.14: **Total kittiwake collision and and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only.**

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
			Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Buchan Ness to Collieston Coast	20.357 (3.988-39.571)	3.218	0.017 (0.006-0.037)	0.01 (0.004-0.023)	0.003	0.002	0.2 (0.117-0.325)	0.092 (0.054-0.149)	0.054	0.025
Calf of Eday	0.043 (0.008-0.083)	0.007	0.001 (0-0.002)	0.001 (0-0.002)	0.000	0.000	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.002	0.002
Cape Wrath	0.288 (0.056-0.56)	0.046	0 (0-0)	0.001 (0-0.002)	0.000	0.000	0 (0-0)	0.008 (0.005-0.014)	0.000	0.002
Copinsay	0.052 (0.01-0.102)	0.008	0.001 (0-0.002)	0.001 (0-0.002)	0.000	0.000	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.002	0.002
East Caithness Cliffs	5.596 (1.096-10.878)	0.885	0.055 (0.02-0.119)	0.032 (0.012-0.07)	0.010	0.006	0.643 (0.376-1.042)	0.284 (0.166-0.46)	0.173	0.077
Fair Isle	0.052 (0.01-0.101)	0.008	0.001 (0-0.002)	0.001 (0-0.002)	0.000	0.000	0.008 (0.005-0.014)	0.008 (0.005-0.014)	0.002	0.002

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
			Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Farne Islands	0.831 (0.163-1.616)	0.131	0.005 (0.002-0.01)	0.003 (0.001-0.006)	0.001	0.001	0.058 (0.034-0.095)	0.025 (0.015-0.041)	0.016	0.007
Forth Islands	1.75 (0.343-3.401)	0.277	0.004 (0.001-0.008)	0.003 (0.001-0.006)	0.001	0.001	0.05 (0.029-0.081)	0.025 (0.015-0.041)	0.014	0.007
Foula	0.028 (0.005-0.055)	0.004	0 (0-0)	0 (0-0)	0.000	0.000	0.008 (0.005-0.014)	0 (0-0)	0.002	0.000
Fowlsheugh	11.418 (2.237-22.196)	1.805	0.012 (0.004-0.027)	0.008 (0.003-0.016)	0.002	0.001	0.15 (0.088-0.243)	0.067 (0.039-0.108)	0.041	0.018
Hoy	0.039 (0.008-0.076)	0.006	0.001 (0-0.002)	0 (0-0)	0.000	0.000	0.008 (0.005-0.014)	0 (0-0)	0.002	0.000
Marwick Head	0.165 (0.032-0.321)	0.026	0.001 (0-0.002)	0 (0-0)	0.000	0.000	0.008 (0.005-0.014)	0 (0-0)	0.002	0.000
North Caithness Cliffs	0.901 (0.177-1.752)	0.142	0.014 (0.005-0.031)	0.009 (0.003-0.018)	0.003	0.002	0.159 (0.093-0.257)	0.075 (0.044-0.122)	0.043	0.020
Noss	0.006 (0.001-0.012)	0.001	0.001 (0-0.002)	0 (0-0)	0.000	0.000	0.008 (0.005-0.014)	0 (0-0)	0.002	0.000
Rousay	0.04 (0.008-0.077)	0.006	0.003 (0.001-0.006)	0.001 (0-0.002)	0.001	0.000	0.025 (0.015-0.041)	0.008 (0.005-0.014)	0.007	0.002
St Abb's Head to Fast Castle	1.268 (0.248-2.464)	0.200	0.005 (0.002-0.01)	0.003 (0.001-0.006)	0.001	0.001	0.058 (0.034-0.095)	0.025 (0.015-0.041)	0.016	0.007
Sumburgh Head	0.085 (0.017-0.165)	0.013	0 (0-0)	0 (0-0)	0.000	0.000	0 (0-0)	0 (0-0)	0.000	0.000

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
			Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Troup, Pennan and Lion's Heads	10.094 (1.978-19.622)	1.596	0.021 (0.008-0.045)	0.012 (0.004-0.027)	0.004	0.002	0.234 (0.137-0.379)	0.108 (0.064-0.176)	0.063	0.029
West Westray	0.27 (0.053-0.526)	0.043	0.016 (0.006-0.035)	0.009 (0.003-0.021)	0.003	0.002	0.192 (0.112-0.311)	0.083 (0.049-0.135)	0.052	0.023
Non-SPA colonies	8.449 (1.655-16.423)	1.336	0.095 (0.035-0.207)	0.056 (0.02-0.121)	0.017	0.010	1.118 (0.655-1.812)	0.492 (0.288-0.798)	0.302	0.133

3.3.3.6. Gannet

The gannet apportioning factors (Table 3.1, Table 3.6 and Table 3.7) were applied to the total displacement and collision impact (Table 2.2) predicted to affect gannet during their breeding and non-breeding season. The resulting impacts apportioned to each SPA are presented below. Table 3.15 provides the apportioned collision and upper displacement estimate while Table 3.16 provides the apportioned collision and lower displacement estimate.

Table 3.15: Total gannet collision and upper displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only.

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact		Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Fair Isle	0.208 (0.045-0.838)	0.272	0.032 (0.004-0.206)	0.025 (0.003-0.162)	0.174	0.137	0.01 (0-0.038)	0.005 (0-0.017)	0.034	0.016
Flamborough and Filey Coast	0.386 (0.084-1.553)	0.505	0.111 (0.015-0.706)	0.081 (0.011-0.515)	0.598	0.436	0.029 (0-0.108)	0.013 (0-0.051)	0.097	0.045
Forth Islands	5.958 (1.299-23.97)	7.798	0.56 (0.074-3.575)	0.408 (0.054-2.604)	3.025	2.204	0.144 (0-0.546)	0.067 (0-0.253)	0.488	0.226
Hermaness, Saxa Vord and Valla Field	0.48 (0.105-1.931)	0.628	0.196 (0.026-1.251)	0.159 (0.021-1.015)	1.058	0.859	0.063 (0.011-2.466E+279)	0.029 (0.005-1.152E+279)	0.214	0.100
North Rona and Sula Sgeir	0.173 (0.038-0.697)	0.227	0.009 (0.001-0.059)	0.016 (0.002-0.103)	0.050	0.087	0 (0-0)	0 (0-0)	0	0.000

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact		Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Noss	0.331 (0.072-1.331)	0.433	0.078 (0.01-0.5)	0.065 (0.009-0.412)	0.423	0.349	0.025 (0.005-9.9E+278)	0.012 (0.002-4.5E+278)	0.086	0.039
St Kilda	0.544 (0.119-2.188)	0.712	0.06 (0.008-0.383)	0.097 (0.013-0.618)	0.324	0.523	0 (0-0)	0 (0-0)	0.000	0.000
Sule Skerry and Sule Stack	0.275 (0.06-1.104)	0.359	0.005 (0.001-0.029)	0.007 (0.001-0.044)	0.025	0.037	0 (0-0)	0 (0-0)	0.000	0.000
Non-SPA colonies	1.234 (0.269-4.966)	1.615	0.06 (0.008-0.383)	0.044 (0.006-0.28)	0.324	0.237	0.016 (0.003-6.12E+278)	0.007 (0.001-2.88E+278)	0.053	0.025

Table 3.16: Total gannet collision and lower displacement estimates seasonally apportioned across all SPAs with connectivity to the AA and that of all non-SPA colonies summed. Collision results are the median estimate with the 95% confidence intervals given in brackets. Values are rounded to 3 decimal places for display purposes only.

	Breeding season		Autumn Migration Period				Spring Migration Period			
Colony / SPA name	Collision impact		Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Fair Isle	0.208 (0.045-0.838)	0.091	0.032 (0.004-0.206)	0.025 (0.003-0.162)	0.058	0.046	0.01 (0-0.038)	0.005 (0-0.017)	0.011	0.005
Flamborough and Filey Coast	0.386 (0.084-1.553)	0.168	0.111 (0.015-0.706)	0.081 (0.011-0.515)	0.199	0.145	0.029 (0-0.108)	0.013 (0-0.051)	0.032	0.015
Forth Islands	5.958 (1.299-23.97)	2.597	0.56 (0.074-3.575)	0.408 (0.054-2.604)	1.008	0.735	0.144 (0-0.546)	0.067 (0-0.253)	0.163	0.075
Hermaness, Saxa Vord and Valla Field	0.48 (0.105-1.931)	0.209	0.196 (0.026-1.251)	0.159 (0.021-1.015)	0.353	0.286	0.063 (0.011-2.466E+279)	0.029 (0.005-1.152E+279)	0.071	0.033
North Rona and Sula Sgeir	0.173 (0.038-0.697)	0.075	0.009 (0.001-0.059)	0.016 (0.002-0.103)	0.017	0.029	0 (0-0)	0 (0-0)	0.000	0.000
Noss	0.331 (0.072-1.331)	0.144	0.078 (0.01-0.5)	0.065 (0.009-0.412)	0.141	0.116	0.025 (0.005-9.9E+278)	0.012 (0.002-4.5E+278)	0.029	0.013
St Kilda	0.544 (0.119-2.188)	0.237	0.06 (0.008-0.383)	0.097 (0.013-0.618)	0.108	0.174	0 (0-0)	0 (0-0)	0.000	0.000

Colony / SPA name	Breeding season		Autumn Migration Period				Spring Migration Period			
	Collision impact		Collision impact		Displacement impact		Collision impact		Displacement impact	
	Collisions	Displacement	Adults	Immatures	Adults	Immatures	Adults	Immatures	Adults	Immatures
Sule Skerry and Sule Stack	0.275 (0.06-1.104)	0.120	0.005 (0.001-0.029)	0.007 (0.001-0.044)	0.008	0.012	0 (0-0)	0 (0-0)	0.000	0.000
Non-SPA colonies	1.234 (0.269-4.966)	0.538	0.06 (0.008-0.383)	0.044 (0.006-0.28)	0.108	0.079	0.016 (0.003-6.12E+278)	0.007 (0.001-2.88E+278)	0.018	0.008

Except in the case of non-breeding impacts apportioned using the Furness (2015) BDMPS approach, all these apportioned impacts are currently in “all birds” and thus include breeding adults, sabbaticals, and immatures. In Volume 3, Appendix 11.5: Offshore Ornithology Population Viability Analysis impacts are partitioned between breeding adults (adults minus sabbaticals) and immatures. Following which, the apportioned impact to each species’ breeding adult regional population and SPAs with connectivity is assessed and PVAs undertaken for any SPA/regional population with an additional mortality rate to breeding adult birds resulting in an increased baseline mortality of two percentage points or more (as per NatureScot 2023).

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5. Annexes

A. Non-SPA Colonies' Apportioning Inputs

A.1.1. Kittiwake

Table 5.1: All non- SPA Kittiwake populations within 300.6 km by sea of the nearest edge of the AA, and their count size in individual breeding adults.

Colony Name	Centroid to Centroid Distance (km)	Count	Year of count
Auchmithie (Lunan Bay to Arbroath)	150.3	7	2018
Baltic Flour Mill (River Tyne to Seaton Sluice)	285.52	164	2015
Black Slough to Burn of Daff (Burn of Daff)	101.01	606	2017
Broad Stack to Stack of Barons Geo (Sumburgh to Peerie Voe)	279.21	94	2021
Brough of Birsay (Brough of Birsay)	260.15	2	2018
Buckiemill (Montrose to Lunan Bay)	144.36	740	2017
Burgh Head 1 (Stronsay)	219.13	8	2018
Burn of Daff to Newtonhill (Burn of Daff)	103.12	1580	2017
Carlin Geo 1 (Stronsay)	219.02	188	2018
Cleit An t-Seabhaig (Smoo to Melvich)	290.31	100	2019
Compass Head (Sumburgh Head Quarries)	276	70	2019
Coquet Island	239.59	1038	2022
Corbie Geo to Whale Stack (Sumburgh to Peerie Voe of Spiggie)	285.27	2	2016
Costa Head (Costa Head)	253.73	46	2021
Cove Bay (Girdle Ness to Hare Ness)	96.61	2646	2017
Cove to Hare Ness (Girdle Ness to Hare Ness)	97.57	722	2017
Covesea (Hopeman Bay)	176.04	1120	2019
Cullernose Point (Howick - Cullornose Point - Dunstanburgh Ca stle Point)	226.85	184	2019
Darn Bay (Catterline to Inverbervie)	119.21	20	2017
Deerness 10 (Deerness)	210.43	10	2019
Dunstanburgh Castle (Howick - Cullornose Point - Dunstanburgh Ca stle Point)	223.85	672	2019
Eilean Iosal (North Sutherland Islands)	280.81	141	2021
Eyemouth to Burnmouth 1 (Eyemouth to Burnmouth)	195.92	120	2018

Colony Name	Centroid to Centroid Distance (km)	Count	Year of count
Eyemouth to Burnmouth 2 (Eyemouth to Burnmouth)	196.91	342	2018
Eyemouth to Burnmouth 3 (Eyemouth to Burnmouth)	196.81	12	2018
Eyemouth to Burnmouth 4 (Eyemouth to Burnmouth)	196.83	124	2018
Eyemouth to Burnmouth 5 (Eyemouth to Burnmouth)	196.6	228	2018
Eyemouth to Burnmouth 6 (Eyemouth to Burnmouth)	196.4	316	2018
Eyemouth to Burnmouth 7 (Eyemouth to Burnmouth)	196.19	276	2018
Eynhallow (Eynhallow)	246.83	76	2018
Faraid Head 2 (Faraid Head/ Balnakeil)	303.9	60	2019
Faraid Head 3 (Faraid Head/ Balnakeil)	303.77	364	2021
Faraid Head 4 (Faraid Head/ Balnakeil)	303.52	232	2021
Findlater (Portsoy to Cullen)	136.68	158	2017
Findon Ness to Black Slough (Findon Ness - Hare Ness)	99.85	160	2017
Fraserburgh Harbour (Fraserburgh)	90.71	162	2021
Garron Point (Portsoy to Cullen)	136	434	2017
Gateshead Kittiwake Tower (River Tyne to Seaton Sluice)	284.84	180	2015
Greg Ness - Seals Hole (Girdle Ness to Hare Ness)	94.83	782	2017
Grid Square HY2112 (Yesnaby - Ness Point, Stromness)	249.7	12	2021
Griskerry to Taing of Maywick (Bigton to Maywick)	291.5	44	2016
Gultak (Holm)	210.59	22	2021
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	98.3	1624	2017
Head of Garness (Rosehearty to Bay of Cullen)	118.21	6	2017
Hich Holm (St. Ninian's Isle)	288.86	56	2017
Holm 4 (Scapa Bay to St. Marys)	221.06	46	2021
Horse Island (HU30) (Horse Island, Colsay, Little and Ladies Holm t o Fitful Head)	274.41	24	2021

Colony Name	Centroid to Centroid Distance (km)	Count	Year of count
Horse of Copinsay (Horse of Copinsay)	206.66	314	2023
Howick (Howick - Cullornose Point - Dunstanburgh Castle Point)	227.73	1280	2019
HOY22 (Hoy and Southwalls)	216.75	66	2019
Inchcolm (Carr Craig, Eyebroughy and Haystack)	233.04	152	2023
Inchkeith (Carr Craig, Eyebroughy and Haystack)	222.73	960	2023
International Coatings (River Tyne to Seaton Sluice)	283.8	306	2015
Kettlaness (KI & SA only) (West Burra - Shetland)	297.06	72	2014
Kineff (Catterline to Inverbervie)	118.14	222	2017
Little John's Haven (Catterline to Inverbervie)	118.53	12	2017
Marsden Cliffs (Marsden Bay)	275.04	4776	2016
Muckle Green Holm (Green Holms)	232.04	64	2018
Mull Head - cliff-nesters (Deerness)	214.16	0	2021
Ness of Ireland (Maywick to St. Ninians Isle)	291.89	84	2014
Newcastle Quayside Buildings (River Tyne to Seaton Sluice)	286.15	258	2015
Newtonhill - May Craig (Newtonhill - Hall Bay)	104.33	578	2017
Noness (No Ness to Levenwick and Boddam to Virkie)	288.79	76	2021
North Shields Warehouse (River Tyne to Seaton Sluice)	274.27	24	2015
North Sutor Of Cromarty/Castlecraig (North Sutor to Shandwick)	210.62	904	2023
Noss Head (Caithness - Wick Bay to Freshwick Bay)	187.94	90	2018
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	111.86	534	2018
Pentland Firth Islands	205.06	353	2021
Perthumie Bay 1 (Hall Bay to Craigeven Bay)	107.44	158	2017
Peterhead South Harbour (urban) (Peterhead)	73.53	66	2021
Portknockie (Portknockie)	142.82	62	2018
Quindry - Hoxa - Dam of Hoxa (South Ronaldsay)	215.69	2	2021

Colony Name	Centroid to Centroid Distance (km)	Count	Year of count
Redhythe Point (Portsoy to Cullen)	135.32	440	2017
Rerwick Head 2 (Rerwick Head to Mirkady Point)	219.63	6	2019
Rothiesholm Head 2 (Stronsay)	224.71	98	2019
Rouen Bay (Catterline to Inverbervie)	116.82	348	2017
Row Head (Yesnaby to Marwick (West Mainland))	254.7	2	2018
Rubha Thormaid (Smoo to Melvich)	288.04	50	2019
Seahouses 1 (Seahouses)	214.82	412	2019
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	99.64	570	2017
Shapinsay 8 (Shapinsay (Coastal))	223.84	26	2021
Shapinsay 9 (Shapinsay (Coastal))	223.68	8	2016
Snow Craig (Rosehearty to Bay of Cullen)	116.33	50	2017
South Havra (Maywick to Scalloway)	294.8	10	2016
South Sutor 3 (South Sutor)	210.67	132	2015
St. Ninian's Isle (St. Ninian's Isle)	289.15	78	2018
Starrie Geo (Sanday - Stove to Kettletoft)	233.74	102	2017
Strathlethan Bay (Stonehaven to Wine Cove)	110.99	26	2021
Sule Skerry and Sule Stack	293.97	186	2018
Swirl Cove (Catterline to Inverbervie)	117.27	166	2017
The Altar - Quindry (South Ronaldsay)	211.55	68	2021
The Ord (Bressay)	301.74	92	2019
The Slainges (Catterline to Inverbervie)	115.94	1934	2017
Troswick Beach to Boddam (No Ness to Levenwick and Boddam to Virkie)	283.16	42	2021
Troswick Ness (No Ness to Levenwick and Boddam to Virkie)	282.91	40	2021
Trumland RSPB (Rousay - South East)	241.26	254	2018
Tyne Bridge North Tower (River Tyne to Seaton Sluice)	286.07	780	2015
Tyne Bridge South Tower (River Tyne to Seaton Sluice)	286.03	310	2015
Tynemouth (River Tyne to Seaton Sluice)	272.35	492	2015
West Burra (West Burra - Shetland)	298.94	130	2014
Whale Wick to Sandwick (incl. Ramna Geo) (West Burra - Shetland)	301.04	58	2016

Colony Name	Centroid to Centroid Distance (km)	Count	Year of count
Whistleberry (Catterline to Inverbervie)	117.56	862	2017
Whiting Ness to Ethie Haven 1 (Lunan Bay to Arbroath)	154	500	2018
Whiting Ness to Ethie Haven 4 (Lunan Bay to Arbroath)	151.34	820	2018
Windwick - Burwick (South Ronaldsay)	205.1	32	2016
Yellow Ark (Catterline to Inverbervie)	119.73	244	2017

A.1.2. Herring Gull

Table 5.2: All non-SPA Herring Gull populations within 85.6 km by sea of the nearest edge of the AA, and their count size in individual breeding adults.

Colony Name	Centroid to Centroid Distance (km)	Count	Year(s) of count
Sandhaven (roofs) (Sandhaven)	94.91	2	2017
Sands of Forvie	86.15	72	2023
St Fergus Gas Terminal (St Fergus)	78.04	50	2021

A.1.3. Guillemot

Table 5.3: All non- SPA guillemot populations within 95.2 km by sea of the nearest edge of the AA, and their count size in individual breeding adults.

Colony Name	Centroid to Centroid Distance (km)	Count	Year(s) of count
Black Slough to Burn of Daff (Burn of Daff)	101.01	16.08	2017
Burn of Daff to Newtonhill (Burn of Daff)	103.12	448.9	2017
Cove Bay (Girdle Ness to Hare Ness)	96.61	225.12	2017
Cove to Hare Ness (Girdle Ness to Hare Ness)	97.57	72.36	2017
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	98.3	841.52	2017
Sands of Forvie	86.15	45.56	2023
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	99.64	735.66	2017

A.1.4. Razorbill

Table 5.4: All non- SPA Razorbill populations within 122.2 km by sea of the nearest edge of the AA, and their count size in individual breeding adults.

Colony Name	Centroid to Centroid Distance (km)	Count	Year(s) of count
Black Slough to Burn of Daff (Burn of Daff)	101.01	53.6	2017
Buchan Ness to Collieston Coast	76.08	7654.08	2023
Burn of Daff to Newtonhill (Burn of Daff)	103.12	144.72	2017
Cove Bay (Girdle Ness to Hare Ness)	96.61	194.3	2017
Cove to Hare Ness (Girdle Ness to Hare Ness)	97.57	202.34	2017
Darn Bay (Catterline to Inverbervie)	119.21	76.38	2017
Doonie Point to Hall Bay (Newton Hill)	106.39	72.36	2017
Findon Ness to Black Slough (Findon Ness - Hare Ness)	99.85	60.3	2017
Greg Ness - Seals Hole (Girdle Ness to Hare Ness)	94.83	1.34	2017
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	98.3	340.36	2017
Head of Garness (Rosehearty to Bay of Cullen)	118.21	108.54	2017
Kineff (Catterline to Inverbervie)	118.14	95.14	2017
Little John's Haven (Catterline to Inverbervie)	118.53	316.24	2017
May Craig - Muchalls (Newtonhill - Hall Bay)	104.9	16.08	2017
Muchalls (Newton Hill)	105.61	115.24	2017
Newtonhill - May Craig (Newtonhill - Hall Bay)	104.33	199.66	2017
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	111.86	340.36	2018
Perthumie Bay 1 (Hall Bay to Craigeven Bay)	107.44	6.7	2017
Rouen Bay (Catterline to Inverbervie)	116.82	637.84	2017
Sands of Forvie	86.15	217.08	2023
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	99.64	844.2	2017
Snow Craig (Rosehearty to Bay of Cullen)	116.33	0	2017
Strathlethan Bay (Stonehaven to Wine Cove)	110.99	34.84	2021
Swirl Cove (Catterline to Inverbervie)	117.27	168.84	2017
The Slainges (Catterline to Inverbervie)	115.94	330.98	2017
Whistleberry (Catterline to Inverbervie)	117.56	1400.3	2017
Yellow Ark (Catterline to Inverbervie)	119.73	360.46	2017

A.1.5. Puffin

Table 5.5: All non- SPA Puffin populations within 265.4 km by sea of the nearest edge the AA, and their count size in individual breeding adults. All puffin counts are sourced from Burnell et al. (2023) so the count year is not given.

Colony Name	Centroid to Centroid Distance (km)	Count
Auchmithie (Lunan Bay to Arbroath)	150.3	10
Black Slough to Burn of Daff (Burn of Daff)	101.01	14
Brough of Birsay (Brough of Birsay)	260.15	10
Buchan Ness to Collieston Coast	76.08	352
Calf of Eday	239.14	168
Castle o' Burrian (Westray - Rapness)	248.26	3068
Cava (Rysa Little and Cava)	226.42	2
Copinsay	206.5	1756
Costa Head (Costa Head)	253.73	38
Costa Hill Cliffs (Costa Head)	251.53	8
Deerness 4 (Rerwick Head to Mirkady Point)	215.6	2
Doonie Point to Hall Bay (Newton Hill)	106.39	4
East Caithness Cliffs	188.47	368
Eynhallow (Eynhallow)	246.83	174
Findon Ness to Black Slough (Findon Ness - Hare Ness)	99.85	4
Flotta 5 (Flotta & Calf of Flotta)	216.08	4
Flotta 6 (Flotta & Calf of Flotta)	214.76	8
Fowlsheugh	112.45	318
Garron Point (Portsoy to Cullen)	136	32
Grid Square HY2217 (Yesnaby to Marwick (West Mainland))	254.03	10
Grid Square HY2221 (Yesnaby to Marwick (West Mainland))	257.69	4
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	98.3	20
Horse of Copinsay (Horse of Copinsay)	206.66	16
HOY 01 - Tysties (Hoy and South Walls - Tysties)	217	50
HOY 02 - Tysties (Hoy and South Walls - Tysties)	214.53	126
HOY 03 - Tysties (Hoy and South Walls - Tysties)	218.66	10
HOY 04 - Tysties (Hoy and South Walls - Tysties)	218.97	2
HOY 06 - Tysties (Hoy and South Walls - Tysties)	220.63	4
Inchcolm (Carr Craig, Eyebroughy and Haystack)	233.04	62
Inchkeith (Carr Craig, Eyebroughy and Haystack)	222.73	5220
Marwick Head	255.05	2

Colony Name	Centroid to Centroid Distance (km)	Count
Melvich 5 (Smoo to Melvich)	256.78	12
Muckle Green Holm (Green Holms)	232.04	66
Mull Head - cliff-nesters (Deerness)	214.16	4
Newtonhill - May Craig (Newtonhill - Hall Bay)	104.33	6
Noss Head (Caithness - Wick Bay to Freshwick Bay)	187.94	6
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	111.86	2
Papa Westray (North Hill and Holm)	256.48	72
Papa Westray 1 - Tysties (Papa Westray - Tysties)	271.2	50
Rouen Bay (Catterline to Inverbervie)	116.82	4
Rousay	247.98	202
Sanday 5 (Sanday)	247.11	16
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	99.64	14
Shapinsay 10 (Shapinsay (Coastal))	223.32	6
Shapinsay 9 (Shapinsay (Coastal))	223.68	12
Skipi Geo to Whitaloo Point (Birsay Cliffs - Point of Buckquoy to Loop of Cruie)	258.81	6
South Walls (South Walls)	218.69	2
St Johns Point (Melvich to Duncansby Stacks SSSI)	208.64	10
Strathy 1 (Smoo to Melvich)	259.25	30
Sumburgh Head	274.94	2320
Switha (Whole Island) (Switha)	214.35	112
The Altar - Quindry (South Ronaldsay)	211.55	32
The Slainges (Catterline to Inverbervie)	115.94	10
Troup, Pennen and Lion's Heads	107.56	60
Ushat Head 1 (Melvich to Duncansby Stacks SSSI)	239.83	8
West Westray	255.47	76
Westray 6 - Tysties (Westray and adjacent Holms - Tysties)	269.8	22
Whistleberry (Catterline to Inverbervie)	117.56	6
Whitaloo Point to Loop of Cruie (Birsay Cliffs - Point of Buckquoy to Loop of Cruie)	257.31	70
Whiting Ness to Ethie Haven 4 (Lunan Bay to Arbroath)	151.34	12
Whiting Ness to Ethie Haven 7 (Lunan Bay to Arbroath)	147.9	12
Whiting Ness to Ethie Haven 8 (Lunan Bay to Arbroath)	146.86	6
Windwick - Burwick (South Ronaldsay)	205.1	14

A.1.6. Gannet

Table 5.6: All non-SPA gannet populations within 509.4 km by sea of the nearest edge of the AA, and their count size in individual breeding adults.

Colony Name	Centroid to Centroid Distance (km)	Count	Year(s) of count
Flannan Isles	474.51	10560	2013
Foula	315.61	4172	2023
Marwick Head	255.05	58	2023
St Abb's Head to Fast Castle	193.63	132	2023
Troup, Pennen and Lion's Heads	107.56	8752	2023
West Westray	255.47	2772	2023

B. Non- SPA Colonies' Breeding Season Apportioning Factors and Estimated Impact

B.1.1. Kittiwake

Table 5.7: Total estimated breeding season kittiwake collision and both upper and lower displacement impacts seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2.

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Auchmithie (Lunan Bay to Arbroath)	0.00	0.002 (0-0.003)	0.001	0.000
Baltic Flour Mill (River Tyne to Seaton Sluice)	0.00	0.011 (0.002-0.022)	0.005	0.002
Black Slough to Burn of Daff (Burn of Daff)	0.00	0.272 (0.053-0.53)	0.129	0.043
Broad Stack to Stack of Barons Geo (Sumburgh to Peerie Voe)	0.00	0.004 (0.001-0.008)	0.002	0.001
Brough of Birsay (Brough of Birsay)	0.00	0 (0-0)	0.000	0.000
Buckiemill (Montrose to Lunan Bay)	0.00	0.171 (0.034-0.332)	0.081	0.027
Burgh Head 1 (Stronsay)	0.00	0.001 (0-0.001)	0.000	0.000
Burn of Daff to Newtonhill (Burn of Daff)	0.01	0.683 (0.134-1.328)	0.324	0.108
Carlin Geo 1 (Stronsay)	0.00	0.014 (0.003-0.028)	0.007	0.002
Cleit An t-Seabhaig (Smoo to Melvich)	0.00	0.005 (0.001-0.009)	0.002	0.001
Compass Head (Sumburgh Head Quarries)	0.00	0.003 (0.001-0.006)	0.001	0.000
Coquet Island	0.00	0.095 (0.019-0.184)	0.045	0.015
Corbie Geo to Whale Stack (Sumburgh to Peerie Voe of Spi ggie)	0.00	0 (0-0)	0.000	0.000
Costa Head (Costa Head)	0.00	0.003 (0.001-0.005)	0.001	0.000
Cove Bay (Girdle Ness to Hare Ness)	0.02	1.29 (0.253-2.508)	0.612	0.204
Cove to Hare Ness (Girdle Ness to Hare Ness)	0.01	0.346 (0.068-0.672)	0.164	0.055

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Covesea (Hopeman Bay)	0.00	0.156 (0.031-0.304)	0.074	0.025
Cullernose Point (Howick - Cullornose Point - Du nstanburgh Castle Point)	0.00	0.019 (0.004-0.036)	0.009	0.003
Darn Bay (Catterline to Inverbervie)	0.00	0.007 (0.001-0.013)	0.003	0.001
Deerness 10 (Deerness)	0.00	0.001 (0-0.002)	0.000	0.000
Dunstanburgh Castle (Howick - Cullornose Point - Du nstanburgh Castle Point)	0.00	0.069 (0.014-0.135)	0.033	0.011
Eilean Iosal (North Sutherland Islands)	0.00	0.007 (0.001-0.014)	0.003	0.001
Eyemouth to Burnmouth 1 (Eyemouth to Burnmouth)	0.00	0.016 (0.003-0.031)	0.008	0.003
Eyemouth to Burnmouth 2 (Eyemouth to Burnmouth)	0.00	0.046 (0.009-0.089)	0.022	0.007
Eyemouth to Burnmouth 3 (Eyemouth to Burnmouth)	0.00	0.002 (0-0.003)	0.001	0.000
Eyemouth to Burnmouth 4 (Eyemouth to Burnmouth)	0.00	0.017 (0.003-0.032)	0.008	0.003
Eyemouth to Burnmouth 5 (Eyemouth to Burnmouth)	0.00	0.031 (0.006-0.059)	0.014	0.005
Eyemouth to Burnmouth 6 (Eyemouth to Burnmouth)	0.00	0.042 (0.008-0.082)	0.020	0.007
Eyemouth to Burnmouth 7 (Eyemouth to Burnmouth)	0.00	0.037 (0.007-0.072)	0.018	0.006
Eynhallow (Eynhallow)	0.00	0.005 (0.001-0.009)	0.002	0.001
Faraid Head 2 (Faraid Head/ Balnakeil)	0.00	0.003 (0-0.005)	0.001	0.000
Faraid Head 3 (Faraid Head/ Balnakeil)	0.00	0.015 (0.003-0.03)	0.007	0.002
Faraid Head 4 (Faraid Head/ Balnakeil)	0.00	0.01 (0.002-0.019)	0.005	0.002
Findlater (Portsoy to Cullen)	0.00	0.037 (0.007-0.071)	0.017	0.006
Findon Ness to Black Slough (Findon Ness - Hare Ness)	0.00	0.073 (0.014-0.143)	0.035	0.012
Fraserburgh Harbour (Fraserburgh)	0.00	0.083 (0.016-0.162)	0.040	0.013

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Garron Point (Portsoy to Cullen)	0.00	0.101 (0.02-0.197)	0.048	0.016
Gateshead Kittiwake Tower (River Tyne to Seaton Sluice)	0.00	0.012 (0.002-0.024)	0.006	0.002
Greg Ness - Seals Hole (Girdle Ness to Hare Ness)	0.01	0.394 (0.077-0.767)	0.187	0.062
Grid Square HY2112 (Yesnaby - Ness Point, Stromness)	0.00	0.001 (0-0.001)	0.000	0.000
Griskerry to Taing of Maywick (Bigton to Maywick)	0.00	0.002 (0-0.003)	0.001	0.000
Gultak (Holm)	0.00	0.002 (0-0.004)	0.001	0.000
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	0.01	0.767 (0.15-1.491)	0.364	0.121
Head of Garness (Rosehearty to Bay of Cullen)	0.00	0.002 (0-0.004)	0.001	0.000
Hich Holm (St. Ninian's Isle)	0.00	0.002 (0-0.004)	0.001	0.000
Holm 4 (Scapa Bay to St. Marys)	0.00	0.004 (0.001-0.007)	0.002	0.001
Horse Island (HU30) (Horse Island, Colsay, Little and Ladies Holm to Fitful Head)	0.00	0.001 (0-0.002)	0.001	0.000
Horse of Copinsay (Horse of Copinsay)	0.00	0.028 (0.005-0.054)	0.013	0.004
Howick (Howick - Cullornose Point - Dunstanburgh Castle Point)	0.00	0.128 (0.025-0.249)	0.061	0.020
HOY22 (Hoy and Southwalls)	0.00	0.005 (0.001-0.01)	0.003	0.001
Inchcolm (Carr Craig, Eyebroughy and Haystack)	0.00	0.015 (0.003-0.03)	0.007	0.002
Inchkeith (Carr Craig, Eyebroughy and Haystack)	0.00	0.104 (0.02-0.202)	0.049	0.016
International Coatings (River Tyne to Seaton Sluice)	0.00	0.021 (0.004-0.041)	0.010	0.003
Kettlaness (KI & SA only) (West Burra - Shetland)	0.00	0.003 (0.001-0.005)	0.001	0.000
Kineff (Catterline to Inverbervie)	0.00	0.075 (0.015-0.145)	0.035	0.012

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Little John's Haven (Catterline to Inverbervie)	0.00	0.004 (0.001-0.008)	0.002	0.001
Marsden Cliffs (Marsden Bay)	0.01	0.342 (0.067-0.666)	0.162	0.054
Muckle Green Holm (Green Holms)	0.00	0.004 (0.001-0.009)	0.002	0.001
Mull Head - cliff-nesters (Deerness)	0.00	0 (0-0)	0.000	0.000
Ness of Ireland (Maywick to St. Ninians Isle)	0.00	0.003 (0.001-0.006)	0.002	0.001
Newcastle Quayside Buildings (River Tyne to Seaton Sluice)	0.00	0.018 (0.003-0.034)	0.008	0.003
Newtonhill - May Craig (Newtonhill - Hall Bay)	0.00	0.245 (0.048-0.475)	0.116	0.039
Noness (No Ness to Levenwick and Bo ddam to Virkie)	0.00	0.003 (0.001-0.006)	0.001	0.000
North Shields Warehouse (River Tyne to Seaton Sluice)	0.00	0.002 (0-0.003)	0.001	0.000
North Sutor Of Cromarty/Castle craig (North Sutor to Shandwick)	0.00	0.088 (0.017-0.171)	0.042	0.014
Noss Head (Caithness - Wick Bay to Fresh wick Bay)	0.00	0.01 (0.002-0.02)	0.005	0.002
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	0.00	0.199 (0.039-0.386)	0.094	0.031
Pentland Firth Islands	0.00	0.032 (0.006-0.063)	0.015	0.005
Perthumie Bay 1 (Hall Bay to Craigeven Bay)	0.00	0.063 (0.012-0.123)	0.030	0.010
Peterhead South Harbour (urba n) (Peterhead)	0.00	0.052 (0.01-0.102)	0.025	0.008
Portknockie (Portknockie)	0.00	0.013 (0.003-0.026)	0.006	0.002
Quindry - Hoxa - Dam of Hoxa (South Ronaldsay)	0.00	0 (0-0)	0.000	0.000
Redhythe Point (Portsoy to Cullen)	0.00	0.104 (0.02-0.202)	0.049	0.016
Rerwick Head 2 (Rerwick Head to Mirkady Point)	0.00	0 (0-0.001)	0.000	0.000

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Rothiesholm Head 2 (Stronsay)	0.00	0.007 (0.001-0.014)	0.003	0.001
Rouen Bay (Catterline to Inverbervie)	0.00	0.119 (0.023-0.232)	0.057	0.019
Row Head (Yesnaby to Marwick (West Mainland))	0.00	0 (0-0)	0.000	0.000
Rubha Thormaid (Smoo to Melvich)	0.00	0.002 (0-0.005)	0.001	0.000
Seahouses 1 (Seahouses)	0.00	0.046 (0.009-0.089)	0.022	0.007
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	0.00	0.263 (0.051-0.511)	0.125	0.042
Shapinsay 8 (Shapinsay (Coastal))	0.00	0.002 (0-0.004)	0.001	0.000
Shapinsay 9 (Shapinsay (Coastal))	0.00	0.001 (0-0.001)	0.000	0.000
Snow Craig (Rosehearty to Bay of Cullen)	0.00	0.016 (0.003-0.031)	0.008	0.003
South Havra (Maywick to Scalloway)	0.00	0 (0-0.001)	0.000	0.000
South Sutor 3 (South Sutor)	0.00	0.013 (0.003-0.025)	0.006	0.002
St. Ninian's Isle (St. Ninian's Isle)	0.00	0.003 (0.001-0.006)	0.001	0.000
Starrie Geo (Sanday - Stove to Kettletoft)	0.00	0.007 (0.001-0.013)	0.003	0.001
Strathlethan Bay (Stonehaven to Wine Cove)	0.00	0.01 (0.002-0.019)	0.005	0.002
Sule Skerry and Sule Stack	0.00	0.008 (0.002-0.016)	0.004	0.001
Swirl Cove (Catterline to Inverbervie)	0.00	0.057 (0.011-0.11)	0.027	0.009
The Altar - Quindry (South Ronaldsay)	0.00	0.006 (0.001-0.011)	0.003	0.001
The Ord (Bressay)	0.00	0.003 (0.001-0.006)	0.002	0.001
The Slainges (Catterline to Inverbervie)	0.01	0.673 (0.132-1.309)	0.319	0.106
Troswick Beach to Boddam (No Ness to Levenwick and Boddam to Virkie)	0.00	0.002 (0-0.003)	0.001	0.000

Colony name	Apportioning factor	Collision	Upper Displacement	Lower Displacement
Troswick Ness (No Ness to Levenwick and Boddam to Virkie)	0.00	0.002 (0-0.003)	0.001	0.000
Trumland RSPB (Rousay - South East)	0.00	0.016 (0.003-0.031)	0.008	0.003
Tyne Bridge North Tower (River Tyne to Seaton Sluice)	0.00	0.053 (0.01-0.103)	0.025	0.008
Tyne Bridge South Tower (River Tyne to Seaton Sluice)	0.00	0.021 (0.004-0.041)	0.010	0.003
Tynemouth (River Tyne to Seaton Sluice)	0.00	0.036 (0.007-0.07)	0.017	0.006
West Burra (West Burra - Shetland)	0.00	0.005 (0.001-0.009)	0.002	0.001
Whale Wick to Sandwick (incl. Ramna Geo) (West Burra - Shetland)	0.00	0.002 (0-0.004)	0.001	0.000
Whistleberry (Catterline to Inverbervie)	0.00	0.292 (0.057-0.568)	0.139	0.046
Whiting Ness to Ethie Haven 1 (Lunan Bay to Arbroath)	0.00	0.103 (0.02-0.2)	0.049	0.016
Whiting Ness to Ethie Haven 4 (Lunan Bay to Arbroath)	0.00	0.174 (0.034-0.338)	0.083	0.028
Windwick - Burwick (South Ronaldsay)	0.00	0.003 (0.001-0.006)	0.001	0.000
Yellow Ark (Catterline to Inverbervie)	0.00	0.08 (0.016-0.155)	0.038	0.013

B.1.2. Herring Gull

Table 5.8: Total estimated herring gull collision impact seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only.

Colony Name	Breeding Apportioning Factor	Breeding Season	Over-Winter Period
Sandhaven (roofs) (Sandhaven)	0.000	0.00 (0-1.0E+269)	0 (0-0)
Sands of Forvie	0.013	0.011 (0-5.1E+270)	0.016 (0-1.1E+285)
St Fergus Gas Terminal (St Fergus)	0.010	0.008 (0-3.7E+270)	0.006 (0-8.0E+284)

B.1.3. Guillemot

Table 5.9: Total estimated guillemot displacement uper and lower estimates seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only.

Colony Name	Breeding Apportioning Factor	Breeding Season		Over-Winter Period	
		Upper estimate	Lower estimate	Upper estimate	Lower estimate
Black Slough to Burn of Daff (Burn of Daff)	0.000	0.065	0.039	0.035	0.012
Burn of Daff to Newtonhill (Burn of Daff)	0.004	1.758	1.055	0.953	0.318
Cove Bay (Girdle Ness to Hare Ness)	0.002	0.957	0.574	0.519	0.173
Cove to Hare Ness (Girdle Ness to Hare Ness)	0.001	0.303	0.182	0.165	0.055
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	0.009	3.497	2.098	1.897	0.632
Sands of Forvie	0.001	0.227	0.136	0.123	0.041
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	0.008	3.006	1.803	1.630	0.543

B.1.4. Razorbill

Table 5.10: Total estimated razorbill breeding season upper and lower displacement estimates seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2.

Colony Name	Apportioning Factor	Upper estimate	Lower estimate
Black Slough to Burn of Daff (Burn of Daff)	0.001	0.058	0.035
Buchan Ness to Collieston Coast	0.271	12.576	7.547
Burn of Daff to Newtonhill (Burn of Daff)	0.003	0.152	0.091
Cove Bay (Girdle Ness to Hare Ness)	0.005	0.224	0.134
Cove to Hare Ness (Girdle Ness to Hare Ness)	0.005	0.230	0.138
Darn Bay (Catterline to Inverbervie)	0.001	0.067	0.040
Doonie Point to Hall Bay (Newton Hill)	0.002	0.073	0.044
Findon Ness to Black Slough (Findon Ness - Hare Ness)	0.001	0.066	0.040
Greg Ness - Seals Hole (Girdle Ness to Hare Ness)	0.000	0.002	0.001
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	0.008	0.382	0.229
Head of Garness (Rosehearty to Bay of Cullen)	0.002	0.090	0.054
Kineff (Catterline to Inverbervie)	0.002	0.084	0.051
Little John's Haven (Catterline to Inverbervie)	0.006	0.280	0.168
May Craig - Muchalls (Newtonhill - Hall Bay)	0.000	0.016	0.010
Muchalls (Newton Hill)	0.003	0.117	0.070
Newtonhill - May Craig (Newtonhill - Hall Bay)	0.004	0.206	0.124
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	0.007	0.322	0.193
Perthumie Bay 1 (Hall Bay to Craigeven Bay)	0.000	0.007	0.004
Rouen Bay (Catterline to Inverbervie)	0.012	0.573	0.344
Sands of Forvie	0.006	0.294	0.176
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	0.020	0.930	0.558
Snow Craig (Rosehearty to Bay of Cullen)	0.000	0.000	0.000
Strathlethan Bay (Stonehaven to Wine Cove)	0.001	0.033	0.020
Swirl Cove (Catterline to Inverbervie)	0.003	0.151	0.091
The Slainges (Catterline to Inverbervie)	0.006	0.300	0.180
Whistleberry (Catterline to Inverbervie)	0.027	1.250	0.750
Yellow Ark (Catterline to Inverbervie)	0.007	0.315	0.189

B.1.5. Puffin

Table 5.11: Total estimated puffin breeding season upper and lower displacement estimates apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only.

Colony Name	Apportioning Factor	Upper estimate	Lower estimate
Auchmithie (Lunan Bay to Arbroath)	0.000	0.004	0.002
Black Slough to Burn of Daff (Burn of Daff)	0.000	0.012	0.007
Brough of Birsay (Brough of Birsay)	0.000	0.001	0.001
Buchan Ness to Collieston Coast	0.009	0.477	0.286
Calf of Eday	0.000	0.019	0.011
Castle o' Burrian (Westray - Rapness)	0.006	0.317	0.190
Cava (Rysa Little and Cava)	0.000	0.000	0.000
Copinsay	0.005	0.274	0.164
Costa Head (Costa Head)	0.000	0.004	0.002
Costa Hill Cliffs (Costa Head)	0.000	0.001	0.000
Deerness 4 (Rerwick Head to Mirkady Point)	0.000	0.000	0.000
Doonie Point to Hall Bay (Newton Hill)	0.000	0.003	0.002
East Caithness Cliffs	0.001	0.076	0.046
Eynhallow (Eynhallow)	0.000	0.019	0.011
Findon Ness to Black Slough (Findon Ness - Hare Ness)	0.000	0.003	0.002
Flotta 5 (Flotta & Calf of Flotta)	0.000	0.001	0.000
Flotta 6 (Flotta & Calf of Flotta)	0.000	0.001	0.001
Fowlsheugh	0.004	0.220	0.132
Garron Point (Portsoy to Cullen)	0.000	0.014	0.008
Grid Square HY2217 (Yesnaby to Marwick (West Mainland))	0.000	0.001	0.001
Grid Square HY2221 (Yesnaby to Marwick (West Mainland))	0.000	0.000	0.000
Hare Ness to Seal's Cove (Findon Ness - Hare Ness)	0.000	0.018	0.011
Horse of Copinsay (Horse of Copinsay)	0.000	0.002	0.001
HOY 01 - Tysties (Hoy and South Walls - Tysties)	0.000	0.007	0.004
HOY 02 - Tysties (Hoy and South Walls - Tysties)	0.000	0.019	0.011
HOY 03 - Tysties (Hoy and South Walls - Tysties)	0.000	0.001	0.001
HOY 04 - Tysties (Hoy and South Walls - Tysties)	0.000	0.000	0.000
HOY 06 - Tysties (Hoy and South Walls - Tysties)	0.000	0.001	0.000
Inchcolm (Carr Craig, Eyebroughy and Haystack)	0.000	0.012	0.007
Inchkeith (Carr Craig, Eyebroughy and Haystack)	0.020	1.066	0.639

Colony Name	Apportioning Factor	Upper estimate	Lower estimate
Marwick Head	0.000	0.000	0.000
Melvich 5 (Smoo to Melvich)	0.000	0.001	0.001
Muckle Green Holm (Green Holms)	0.000	0.008	0.005
Mull Head - cliff-nesters (Deerness)	0.000	0.001	0.000
Newtonhill - May Craig (Newtonhill - Hall Bay)	0.000	0.005	0.003
Noss Head (Caithness - Wick Bay to Freshwick Bay)	0.000	0.001	0.001
Old Hall Bay - Castle Haven (Stonehaven to Wine Cove)	0.000	0.001	0.001
Papa Westray (North Hill and Holm)	0.000	0.007	0.004
Papa Westray 1 - Tysties (Papa Westray - Tysties)	0.000	0.004	0.003
Rouen Bay (Catterline to Inverbervie)	0.000	0.003	0.002
Rousay	0.000	0.021	0.013
Sanday 5 (Sanday)	0.000	0.002	0.001
Seal's Cove to Findon Ness (Findon Ness - Hare Ness)	0.000	0.012	0.007
Shapinsay 10 (Shapinsay (Coastal))	0.000	0.001	0.000
Shapinsay 9 (Shapinsay (Coastal))	0.000	0.002	0.001
Skipi Geo to Whitaloo Point (Birsay Cliffs - Point of Buckquoy to Loop of Cruie)	0.000	0.001	0.000
South Walls (South Walls)	0.000	0.000	0.000
St Johns Point (Melvich to Duncansby Stacks SSSI)	0.000	0.002	0.001
Strathy 1 (Smoo to Melvich)	0.000	0.003	0.002
Sumburgh Head	0.003	0.175	0.105
Switha (Whole Island) (Switha)	0.000	0.017	0.010
The Altar - Quindry (South Ronaldsay)	0.000	0.005	0.003
The Slainges (Catterline to Inverbervie)	0.000	0.007	0.004
Troup, Pennen and Lion's Heads	0.001	0.040	0.024
Ushat Head 1 (Melvich to Duncansby Stacks SSSI)	0.000	0.001	0.001
West Westray	0.000	0.007	0.004
Westray 6 - Tysties (Westray and adjacent Holms - Tysties)	0.000	0.002	0.001
Whistleberry (Catterline to Inverbervie)	0.000	0.004	0.002
Whitaloo Point to Loop of Cruie (Birsay Cliffs - Point of Buckquoy to Loop of Cruie)	0.000	0.007	0.004
Whiting Ness to Ethie Haven 4 (Lunan Bay to Arbroath)	0.000	0.005	0.003
Whiting Ness to Ethie Haven 7 (Lunan Bay to Arbroath)	0.000	0.005	0.003
Whiting Ness to Ethie Haven 8 (Lunan Bay to Arbroath)	0.000	0.003	0.002
Windwick - Burwick (South Ronaldsay)	0.000	0.002	0.001

B.1.6. Gannet

Table 5.12: Total estimated breeding season gannet collision and both upper and lower displacement impacts seasonally apportioned across all non-SPA colonies with connectivity to the AA. Values are rounded to 3 decimal places for display purposes only. Non-breeding season results are not presented as these were only apportioned to as a whole because this is the resolution presented in Furness (2015). This is discussed in Section 2.4.2

Colony Name	Apportioning Factor	Collision	Upper Displacement	Lower Displacement
Flannan Isles	0.007	0.063 (0.014-0.255)	0.083	0.028
Foula	0.005	0.052 (0.011-0.211)	0.069	0.023
Marwick Head	0.000	0.001 (0-0.005)	0.002	0.001
St Abb's Head to Fast Castle	0.001	0.006 (0.001-0.024)	0.008	0.003
Troup, Pennen and Lion's Heads	0.110	1.057 (0.23-4.251)	1.383	0.461
West Westray	0.006	0.055 (0.012-0.22)	0.072	0.024

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