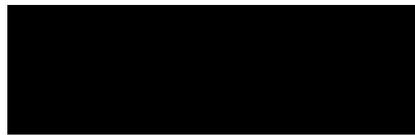


Neart na Gaoithe Offshore Wind Farm

Environmental Impact Assessment Report: Addendum of Additional Information

SIGN OFF		
Name and Role	Signature	Date
Ewan Walker Environment and Consents Manager		25 th July 2018
David Sweenie Development Manager		25 th July 2018

Contents

1	Introduction.....	4
2	MS Queries of 30 May 2018 & NnGOWL Responses.....	5
2.1	MS Ornithology Comment 1	5
2.2	MS Ornithology Comment 3	5
2.3	MS Ornithology Comment 4	8
2.4	MS Ornithology Comment 5	9
3	MS Queries of 19 June 2018 & NnGOWL Responses	10
3.1	Additional MS Question 1	10
3.2	Additional MS Question 2	11
3.3	Additional MS Question 3	11
3.4	Additional MS Question 4	11
3.5	Additional MS Question 5	17
3.6	Additional MS Question 6	17
4	Erratum for Chapter 9, EIAR	18
5	Erratum for HRA	25
	Appendix A: Comparison of revised PVA model runs for guillemot and razorbill	29

1 Introduction

This report comprises an Addendum of Additional Information in support of applications submitted by behalf by Neart na Gaoithe Offshore Wind Ltd (NnGOWL) in March 2018 under Section 36 of the Electricity Act 1989 for consent to construct and operate the Neart na Gaoithe Offshore Wind Farm and the Marine Licence applications submitted pursuant to Part 4 of the Marine (Scotland) Act 2010 in respect of the construction and maintenance of the Neart na Gaoithe Offshore Wind Farm and the associated Offshore Transmission Works.

This Addendum comprises Additional Information as defined within the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

The following responses have been prepared following receipt of comments from Marine Scotland and Scottish Natural Heritage (SNH). Numbering on this document follows the comment numbering on the Marine Scotland queries. In addition to the two sets of comments, a conference call was held on 25th June 2018 between Marine Scotland, SNH and NnG, where initial responses from NnG to the MS comments were discussed further. It was agreed that NnG would provide additional detail to address the MS comments.

2 MS Queries of 30 May 2018 & NnGOWL Responses

The first set of comments from Marine Scotland were received on 30th May 2018.

2.1 MS Ornithology Comment 1

NNG have assumed that the SPA colony population sizes for guillemot and razorbill provided by SNH referred to pairs when in fact they were numbers of individuals. This has resulted in the starting populations assumed in the PVAs for these species being double what they should be. If NNG have applied a percentage population change to this population (based on effects estimated from their at sea surveys and concurrent colony counts) then this doubling of starting population will not have any effect on the PVA metrics that have been presented. However, if the effect estimated from the at sea survey data has been applied to the PVA starting population as number of individuals, and the starting population is double what it should be, then the population level impact as expressed by the PVA metrics will be underestimated by approximately half. NNG should clarify how the estimated effects have been applied in the PVA and what if any implications this may have on the PVA metrics produced.

2.1.1 NnG Response

The numbers of breeding pairs presented in the PVA for razorbill and guillemot were taken from the table of SPA populations provided by SNH in November 2017. Following receipt of revisions to SPA population estimates for guillemot and razorbill from SNH in May 2018, the PVA modelling was re-run for these two species for two SPAs (Forth Islands SPA and Fowlsheugh SPA), using the revised SPA population figures as the start populations.

For both species, although the revised start population was lower than that originally submitted, the outputs of the revised PVA modelling were not significantly different from the originally calculated, as demonstrated in the tables presented in Appendix A.

Where appropriate, cross-references are made to original tables in the Ornithology chapter of the NnG Environmental Impact Assessment Report (EIAR).

2.2 MS Ornithology Comment 3

It is unclear how the value of 228 adult kittiwake collisions at Forth Islands SPA assumed in the PVA cumulative impact scenarios has been calculated. The information presented in the various effects tables in Chapter 9 of the ES suggests a substantially lower value. This highlights a more general point that it can be difficult to piece together the sources of the estimated effects that are applied in the assessment from the tables provided due to presentation being distributed across varying categories of adults, all ages, immature, SPA, non SPA etc. Clarification should be provided on how the 228 value for kittiwake has been obtained.

2.2.1 NnG Response

For the cumulative assessment of NnG with other planned Forth and Tay wind farms, numbers of collisions were assessed for each wind farm before being summed for the cumulative assessment. Two worst case cumulative scenarios were assessed; one using the most recent 2017 scenario for NnG together with the 2014 consented scenarios for Inch Cape and Seagreen A and B (2014 scenario), and another scenario using the most recent 2017 scenarios for all wind farms (2017 scenario).

In order to be able to use the number of collisions in the cumulative assessment in the population viability analyses, the numbers of collisions were apportioned to the modelled populations. This was calculated by first multiplying the

number of collisions for the wind farms by the proportion of birds breeding in all SPAs within the vicinity. The resulting figure was then apportioned across all relevant SPA populations based on the SPA population sizes in 2015.

Example - Kittiwake in the Forth Islands SPA for the 2014 scenario (228 collisions)

Collision rate modelling was based on most recent 2017 scenario for NnG and 2014 consented scenarios for Inch Cape and Seagreen A and B.

As outlined in Appendix 9.8 (PVA methods and Plots), apportioning of collision effects to the relevant population was carried out using a two-step process. Firstly, as the proportion breeding within SPAs within the relevant area, and secondly, across the relevant SPA populations based on the latest population sizes as presented in the updated Appendix A(ii) in the Scoping Opinion (Marine Scotland, 2017). The proportion of kittiwakes breeding in SPAs within range of NnG, Inch Cape and Seagreen A & B is presented in Table 2.2 of Appendix 9.8 (PVA methods and Plots). From this table it can be seen that 79.3% of kittiwakes in NnG originate from the Forth Islands SPA population. For Inch Cape, this proportion is 59.2% and for Seagreen A and B it is 68.6%.

The proportion of kittiwakes that breed at the Forth Islands SPA compared against all SPA breeding populations within mean maximum foraging range (Forth Islands, Fowlsheugh and St Abbs Head) is 26.4%. This figure is also presented in Table 2.2 of Appendix 9.8 (PVA methods and Plots).

The number of annual collisions estimated for Inch Cape, based on the 2014 design scenarios (516 birds) were taken from a spreadsheet provided by Inch Cape on 14th November 2017. This file was based on 2014 figures but used 2017 SNH advice, such as nocturnal activity value of 2 (rather than 3). The data was also based on different RPMs for the breeding season and non-breeding season. In the NnG submission, monthly and total annual kittiwake collisions for Inch Cape were presented in Table 5 of Appendix 9.3 (CRM methods), however, the Inch Cape figures presented in that table were incorrect, as were Tables 9.146 & 9.148 of Chapter 9 of the EIAR. The correct monthly and total figures are presented below in Table 1. It can be seen from this revised table, that the annual figure for kittiwake collisions based on the 2014 CRM provided by Inch Cape is 516 birds, which matches the figure presented in the "Apportioning for PVA 27-6-2018" spreadsheet.

The number of annual kittiwake collisions estimated for Seagreen A&B, based on the 2014 design scenarios (782 birds) were taken from a spreadsheet circulated by Marine Scotland on 11th October 2017. In the NnG submission, monthly and total annual kittiwake collisions for Seagreen A&B based on the 2014 design scenario, were presented in Table 5 of Appendix 9.3 (CRM methods). From this table, the total annual collision estimate was 782 birds (420 birds at Seagreen A & 362 birds at Seagreen B). This matches the figure presented in the "Apportioning for PVA 27-6-2018" spreadsheet.

Table 1 – Estimated number of kittiwakes predicted to be at risk of mortality due to collision impacts from Inch Cape Wind Farm, based on 2014 turbine parameters and Band Option Model 2. (Source: ICOL)

AR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
0%	610.25	140.16	1,960.94	2,041.53	3,030.51	7,256.00	13,451.92	1,697.09	8,465.13	5,282.28	1,899.72	1,039.83	46,875
98.9%	6.71	1.54	21.57	22.46	33.34	79.82	147.97	18.67	93.12	58.11	20.90	11.44	516

Table 2 – Estimated number of gannets predicted to be at risk of mortality due to collision impacts from Inch Cape Wind Farm, based on 2014 turbine parameters and Band Option Model 2. (Source: ICOL)

AR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
0%	149.94	625.29	891.65	3,387.65	7,958.58	7,289.13	6,919.90	8,706.37	2,142.29	1,418.47	203.30	0.00	39,693
98.9%	1.65	6.88	9.81	37.26	87.54	80.18	76.12	95.77	23.57	15.60	2.24	0.00	437

These two estimates add up to a total of 1,298 annual kittiwake collisions. The sum of these 2014 figures and the NnG 2017 figure (28 collisions) are 1,326 collisions.

The total number of annual collisions were multiplied by the proportion of kittiwakes breeding in SPAs within mean maximum foraging range of Inch Cape and Seagreen A & B (Table 2.2, Appendix 9.8), and the overall proportion of kittiwakes at Forth Islands SPA compared to overall SPA population in mean maximum foraging range (Table 2.2, Appendix 9.8). These values are also shown in the attached “Apportioning for PVA 27-6-2018” spreadsheet.

Number of collisions after apportioning were as follows:

- Neart na Gaoithe - 6 collisions;
- Inch Cape - 81 collisions, and;
- Seagreen A and B - 141 collisions.

The sum of these results in a total of 228 collisions of kittiwakes from the Forth Islands SPA across NnG and the 2014 design scenarios for Inch Cape and Seagreen A & B. These values are also shown in the attached “Apportioning for PVA 27-6-2018” spreadsheet.

Further detail on where the effects presented in the PVA scenario spreadsheet are presented in the EIAR/HRA/relevant appendices is provided in Tables 3 to 7 below.

2.3 MS Ornithology Comment 4

It is not clear how the kittiwake or gannet collision effects for the 2014 consented ICOL and Seagreen windfarms have been derived, and they appear larger than expected based on the information presented elsewhere in the application documents. Table 9-10 of chapter 9 suggests that input parameters for these scenarios are presented in Appendix 9.3 “Collision Rate Modelling Methods, Inputs and Results” but no information on the wind farm parameters is present. Clarification of how the 2014 ICOL and SG kittiwake and gannet collision effects have been derived would assist in the assessment process.

2.3.1 NnG Response

To clarify, kittiwake and gannet collision estimates from the 2014 Inch Cape CRM outputs were taken from spreadsheets circulated by ICOL to NnG and Seagreen on 6th Dec 2017. Monthly and annual kittiwake collision estimates for Inch Cape were presented in Table 5 of Appendix 9.3 in the NnG submission, however, these figures were incorrect, as the wrong information from the spreadsheet was used in Table 5. Correct monthly and annual kittiwake collision estimates from the 2014 Inch Cape CRM outputs are presented in Table 1 of this document.

Similarly, monthly and annual gannet collision estimates for Inch Cape were presented in Table 4 of Appendix 9.3 in the NnG submission, however, these figures were also incorrect, as the wrong information from the spreadsheet was used in Table 4. Correct monthly and annual gannet collision estimates from the 2014 Inch Cape CRM outputs are presented in Table 2 of this document.

Kittiwake and gannet collision estimates from the 2014 Seagreen A & B CRM outputs were taken from spreadsheets circulated by Marine Scotland on 11th October 2017. These outputs are presented in Tables 4 and 5 of Appendix 9.3 “Collision Rate Modelling Methods, Inputs and Results”, which is why Appendix 9.3 was cross-referenced in Table 9.10, as highlighted in the MSS comment. The reference in Table 9.10 about input parameters for these outputs was erroneous. No information on 2014 Inch Cape or Seagreen turbine parameters was presented in the NnG application.

2.4 MS Ornithology Comment 5

The baseline Forth Islands kittiwake PVA exhibits an increasing population, despite other PVAs and all current understanding suggesting that this is unlikely to be realistic. However, this increasing trend is unlikely to have any meaningful influence on the PVA metrics produced as they are all relatively insensitive to the misspecification of demographic rates. Clarification of the reason for this increasing trend and potential implications for the conclusions reached in the application would assist the assessment process.

2.4.1 NnG Response

The data available to NnG at the time of creating the PVAs all indicate an increasing population of kittiwake in the Forth Islands. The baseline population is based on data from SNH, JNCC, IOM NNR (SNH) and Farne Islands (1st year survival). Data from SNH and JNCC suggest an increasing population, with JNCC figures giving a growth rate between 2000 and 2015 of 0.9% per annum - this is the same as in the modelled population.

Also, IOM NNR (SNH) figures give a 22% increase in 2017 (3,507 pairs). Figures provided by SNH show increase in Forth Islands population between 2012 (3,776 pairs) and 2017 (4,663 pairs).

(e.g. <http://jncc.defra.gov.uk/page-2889> and <https://isleofmaynnr.wordpress.com/2017/08/10/kittiwake-count/>)

The modelled population has an increase of 0.9% per annum, which is fairly low. Having a population with a decreasing population of a similar rate would be unlikely to have an influence on the output figures for 50th centiles, but would result in different figures for growth rates and population sizes.

3 MS Queries of 19 June 2018 & NnGOWL Responses

Additional queries were received from Marine Scotland on 19th June 2018

3.1 Additional MS Question 1

Clarify what the scenarios in the headings (row 3) of the PVA results spreadsheet mean?

3.1.1 NnG Response

The following cell cross-references refer to the “Scenarios” tab of the Appendix 9.8 PVA Results spreadsheet.

- Cell 3b – “Populations” specifies the relevant SPA populations, either Forth Islands SPA or Fowlsheugh SPA.
- Cell 3c – “Start population (pairs). Taken from App. Aii (updated) Tables 4a and 4b.” – This is the number of breeding pairs in the initial year of the model run, as provided by SNH.
- Cell 3d – “Start Year” – This is the initial year of the model run.
- Cell 3e – “Population 2009-2011” - used to calculate the fraction of the population that dies through collisions and/or displacement.
- Cell 3f – “Source 2009-2011 population” – source for the populations used in the PVA analysis.
- Cell 3g “Baseline” – this is the predicted end growth rate or end population in the “baseline” or no wind farm scenario
- Cell 3h “NNG” – 2017 NnG design scenario
- Cell 3i “F&T” –Inch Cape and Seagreen projects
- Cell 3j “UK” – Other offshore wind farm projects in North Sea (for kittiwake) or North Sea & English Channel (for gannet)
- Cell 3k “Collision (all year)” – this is the predicted end growth rate or end population if annual collision mortality effects from NnG are included.
- Cell 3l “Displacement all year” - this is the predicted end growth rate or end population if annual displacement mortality effects from NnG are included.
- Cell 3m “Collision (all year) & Displacement (all year)” – this is the predicted end growth rate or end population if annual collision mortality effects and annual displacement mortality effects from NnG are included.
- Cell 3n “Collision (all year) & Displacement (breeding season)” – this is the predicted end growth rate or end population if annual collision mortality effects and breeding season only displacement mortality effects from NnG are included.
- Cells 3o to 3q are similar scenarios for the 2017 NnG scenario and Forth & Tay projects 2014 design scenarios.
- Cells 3r to 3t are similar scenarios for the 2017 NnG scenario and Forth & Tay projects 2017 design scenarios.
- Cell 3u “Collision (F&T br + UK non-br)” – this is predicted end growth rate or end population if collision mortality effects for the 2017 NnG scenario and the 2017 Forth & Tay projects in the breeding season

and the UK projects in the non-breeding season are included (for gannet & kittiwake only). Gannet includes English Channel projects, kittiwake is North Sea projects only.

- Cell 3v “UK & 2014 F&T & NnG 2017” – this is the predicted end growth rate or end population if collision mortality effects for the 2017 NnG scenario and the 2014 Forth & Tay projects in the breeding season and the UK projects in the non-breeding season are included (for gannet & kittiwake only). Gannet includes English Channel projects, kittiwake is North Sea projects only.
- For the scenarios in Cells 3u and 3v, breeding season collision & displacement effects from Forth & Tay wind farms were summed with the non-breeding effects from Forth & Tay wind farms and relevant UK wind farms. Displacement of kittiwake at English offshore wind farms has been considered as nil and has not been assessed. The effects of UK wind farms outside of the Forth and Tay wind farms were therefore limited to collisions during the non-breeding season.

3.2 Additional MS Question 2

Specify what the e.g. “11 ad + 80” in each of the scenarios means?

3.2.1 NnG Response

In the “Scenarios” tab, the number of affected birds predicted by CRM and/or the displacement assessment is given in the relevant cell for each species. The breakdown of mortality is explained in the title of each section (Row 3). For example, in Column K (Collision all year), cell K4 states 108 gannets from the Forth Islands SPA were predicted to suffer mortality from NnG. In Column L (Displacement all year), cell L8 states 3 adult guillemots from the Forth Islands SPA were predicted to suffer displacement mortality from NnG in the breeding season, with a further 8 birds from Forth Islands SPA predicted to suffer displacement from NnG in the non-breeding season. In Column N (Collision (all year) + Displacement (breeding season only)), cell N5 states 3 adults from displacement in the breeding season and 6 birds from collision (all year).

An explanation of the numbers in each of these scenarios is given in the “comment box” for the relevant cell in Column K of the attached “NnG 2018 Ornithology Scenarios and effects summary table 27-6-2018.xls spreadsheet.

3.3 Additional MS Question 3

Confirm that the effect values in the scenarios spreadsheet were the ones assumed in the PVAs.

3.3.1 NnG Response

The effects values in the scenarios spreadsheet were the ones assumed in the PVA.

3.4 Additional MS Question 4

Indicate where (document and table/s number/s) the effects presented in the scenario spreadsheet are presented in the EIA/ relevant appendices.

3.4.1 NnG Response

Information regarding the PVA modelling was presented in two appendices of Chapter 9 of the EIAR:

- Appendix 9.8 – PVA Methods and Plots
- Appendix 9.8 – PVA results spreadsheet

Within Appendix 9.8 PVA Results spreadsheet, the first tab “Scenarios” presents the predicted mortality arising from collisions and/or displacement for each species, apportioned between the Forth Islands SPA and Fowlsheugh SPA.

Guidance in the Scoping Opinion (Marine Scotland, 2017), requested that these two SPAs be considered for the PVA modelling.

Both Marine Scotland and SNH have requested further clarification on where these numbers are presented in Chapter 9 of the EIAR, the HRA or the associated appendices.

This information is contained in an additional spreadsheet that was not submitted as part of the NnG application. It can be found as part of this response, in the attached spreadsheet “Apportioning for PVA 27-6-2018”.

3.4.1.1 NnG alone

Within the “Apportioning for PVA 27-6-2018” spreadsheet, Column L shows the estimated annual mortality for collision and displacement arising from NnG across all SPAs. For the PVA, this mortality was then apportioned between the SPAs to give the estimated mortality for each SPA.

The methods used for SPA apportioning for the PVA and the HRA were slightly different, due to differences in guidance presented within the Scoping Opinion. For the PVA, the aim was to estimate the effects of collisions throughout the year and on all age classes; as described in Section 8.10.3 (p 38) of the Scoping Opinion. For the apportioning for the PVA, the apportioning method described in 8.9.3 (p 35) in the Scoping Opinion, which apportioned birds within all SPAs and then to the individual SPAs was applied. After this stage, the annual number of collisions could be applied to the PVA as required (i.e. per age class and, if required, per season).

The spreadsheets used to apportion the potential impacts across SPA colonies and non-SPA colonies for the HRA originated from those used by the SNCBs when undertaking the same exercise for the origin project in 2014. The SPA population numbers were updated in line with the advice received during Scoping. This was felt to be the most suitable approach for HRA purposes. Apportioning spreadsheets for kittiwake, guillemot and razorbill used for the HRA are included in this submission.

Table 3 – Cross-references for 2017 NnG mortality figures used in SPA apportioning for PVA and HRA

Species	Predicted mortality (Column L Apportioning for PVA 27-6-18.xls)	Season & Age	Cross-reference to source
Gannet	108 collisions	Annual, all ages	Table 2.9, HRA
Kittiwake	28 collisions	Annual, all ages	Table 2.9, HRA
Kittiwake	12 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.20, HRA
Puffin	37 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.42, HRA
Guillemot	15 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.59, HRA
Razorbill	4 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.46, HRA
Guillemot	46 birds from displacement (includes 2km buffer)	Non-breeding season, all ages	Table 2.62, HRA

Razorbill	19 birds from displacement (includes 2km buffer)	Non-breeding season, all ages	Table 2.49, HRA
-----------	--	-------------------------------	-----------------

Hence there are slight differences in the apportioning tables, however, the estimated combined mortality figures are the same for the PVA and the HRA. Table 3 below, details where these mortality figures are shown in the “Scenarios” tab of the PVA apportioning spreadsheet, and the HRA document. These table cross-references are also given in the relevant cell comments in Column L of the attached spreadsheet “Apportioning for PVA 27-6-2018”. Further details of cross-references between the PVA apportioning spreadsheet and the HRA/EIAR for the different design scenarios are presented in Tables 4 to 7 below.

3.4.1.2 Inch Cape 2017 Design Scenario

Table 4 – Cross-references for 2017 Inch Cape mortality figures used in SPA apportioning for PVA, HRA & EIAR

Species	Predicted mortality (Column N Apportioning for PVA 27-6-18.xls)	Season & Age	Cross-reference to source
Gannet	125 collisions	Annual, all ages	Appendix 9.3 Inch Cape 2017.xls, Tab 3. Tables 2.11 & 2.13 combined, HRA Tables 9.139 & 9.141 combined, EIAR
Kittiwake	77 collisions	Annual, all ages	Appendix 9.3 Inch Cape 2017.xls, Tab 5. Tables 2.29 and 2.32 combined, HRA (79 birds ¹) Tables 9.145 & 9.147, EIAR (79 birds ¹)
Kittiwake	21 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.34, HRA (22 birds ¹)
Puffin	46 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.44, HRA
Guillemot	33 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.66, HRA
Guillemot	23 birds from displacement (includes 2km buffer)	Non-breeding season, all ages	Table 2.68, HRA
Razorbill	20 adults from displacement (includes 2km buffer)	Breeding season, adults	Table 2.53, HRA
Razorbill	29 birds from displacement (includes 2km buffer)	Non-breeding season, all ages	Table 2.55, HRA

1 Slight difference in total is due to rounding of seasonal figures to nearest whole bird

3.4.1.3 Seagreen 2017 Design Scenario

Table 5 – Cross-references for 2017 Seagreen mortality figures used in SPA apportioning for PVA, HRA & EIAR

Species	Predicted mortality (Column P Apportioning for PVA 27-6-18.xls)	Season & Age	Cross-reference to source
Gannet	365 collisions	Annual, all ages	Appendix 9.3 Seagreen 2017.xls, Tab 3. Tables, 2.11 & 2.13 combined, HRA Tables 9.139 & 9.141 combined, EIAR
Kittiwake	344 collisions	Annual, all ages	Appendix 9.3 Seagreen 2017.xls, Tab 4. Tables 2.29 & 2.32 combined, HRA (350 birds ²) Tables 9.145 & 9.147 combined, EIAR (350 birds ²)
Kittiwake	27 adults ³ from displacement (no 2km buffer)	Breeding season, adults	Table 2.34, HRA and Table 9.118 in EIAR give correct mortality total of 19 adults.
Puffin	48 adults from displacement (no 2km buffer)	Breeding season, adults	Table 2.44, HRA
Guillemot	41 adults ⁴ from displacement (no 2km buffer)	Breeding season, adults	Table 2.66, HRA and Table 9.122 in EIAR give correct mortality total of 74 adults.
Guillemot	51 birds from displacement (no 2km buffer)	Non-breeding season, all ages	Table 2.68, HRA
Razorbill	7 adults ⁵ from displacement (no 2km buffer)	Breeding season, adults	Table 2.53, HRA and Table 9.126 in EIAR give correct mortality total of 9 adults.
Razorbill	12 birds from displacement (no 2km buffer)	Non-breeding season, all ages	Table 2.55, HRA

2 Tables 2.32 & 9.147 contain an over-estimate in the non-breeding season total of six kittiwake collisions. This is due to an error in the calculation of the Autumn period of the non-breeding season (September to December), which was presented as 151 birds, when it should be 144 birds, as specified in Appendix 9.3 Seagreen 2017.xls, Tab 4. A corrected version of Table 9.147 and associated text is presented in the Erratum section of this document.

3 The mortality figure for Seagreen A&B of 27 adults used in the PVA is an error – the total for Seagreen A&B should add up to 19 birds, not 27 as presented. Table 2.34 in HRA and Table 9.118 in Chapter 9 are correct.

4 The mortality figure for Seagreen A&B of 41 adults used in the PVA is an error – the total for Seagreen A&B should add up to 74 birds, not 41 as presented. Table 2.66 in HRA and Table 9.122 in Chapter 9 are correct.

5 The mortality figure for Seagreen A&B of 7 adults used in the PVA is an error – the total for Seagreen A&B should add up to 9 birds, not 7 as presented. Table 2.53 in HRA and Table 9.126 in Chapter 9 are correct.

Overall, it was concluded that using the corrected figures for displacement-related mortality from Table 5 on adults during the breeding season for kittiwake, guillemot and razorbill would make very little difference, if any, to the PVAs.

The differences for kittiwake and razorbill are very small. After apportioning between the SPAs for the PVA these are:

Kittiwake

Forth Islands	9	(was 11; diff -1.45) [Cell S14, Apportioning for PVA.xls]
Fowlsheugh	19	(was 22; diff -3.00) [Cell S15, Apportioning for PVA.xls]

Razorbill

Forth Islands	9	(was 8; diff +0.55) [Cell S22, Apportioning for PVA.xls]
Fowlsheugh	12	(was 11; diff +0.70) [Cell S23, Apportioning for PVA.xls]

For guillemot the differences are slightly more:

Guillemot

Forth Islands	21	(was 15; diff +5.65) [Cell S18, Apportioning for PVA.xls]
Fowlsheugh	41	(was 30; diff +10.90) [Cell S19, Apportioning for PVA.xls]

Nevertheless, it was concluded that this will not make a significant difference to the PVAs. For example, when the start populations were revised, the guillemot start population dropped from 38,000 to 19,000 for Forth Islands and from 74,000 to 37,000 for Fowlsheugh. Taking this mortality as a percentage of the start populations, the change is from 0.08% to 0.11% for both SPA scenarios. This is considered unlikely to make a significant difference to the predicted PVA outcomes.

3.4.1.4 Inch Cape 2014 Design Scenario

Table 6 – Cross-references for 2014 Inch Cape mortality figures used in SPA apportioning for PVA, HRA & EIAR

Species	Predicted mortality (Column N) Apportioning for PVA 27-6-18.xls	Season & Age	Cross-reference to source
Gannet	437 collisions	Annual, all ages	Monthly & total figures for gannet collisions at Inch Cape given in Appendix 9.3, Table 4 are incorrect. Correct figures are presented in Table 1 of this document. Tables 2.12 & 2.13 combined, HRA gives total of 410 birds –

			<p>this total should be 437 collisions – see Table 1 of this document. Revised versions of Tables 2.12, 2.13 and 2.14 and associated text are presented in the HRA Erratum section of this document.</p> <p>Tables 9.140 & 9.142 combined, EIAR gives total of 410 birds – this total should be 437 collisions – see Table 1 of this document. Revised versions of Tables 9.140 & 9.142 and associated text are presented in the EIAR Erratum section of this document.</p>
Kittiwake	516 collisions	Annual, all ages	<p>Monthly & total figures for kittiwake collisions at Inch Cape given in Appendix 9.3, Table 5 are incorrect. Correct figures are presented in Table 1 of this document.</p> <p>Tables 2.30 & 2.32 combined, HRA gives total of 247 birds – this total should be 516 collisions – see Table 2 of this document. Revised versions of Tables 2.30 & 2.32 and associated text are presented in the HRA Erratum section of this document.</p> <p>Tables 9.146 & 9.148 combined, EIAR gives total of 247 birds – this total should be 516 collisions – see Table 2 of this document. Revised versions of Tables 9.146 & 9.148 and associated text are presented in the EIAR Erratum section of this document.</p>

3.4.1.5 Seagreen 2014 Design Scenario

Table 7 – Cross-references for 2014 Seagreen mortality figures used in SPA apportioning for PVA, HRA & EIAR

Species	Predicted mortality (Column P Apportioning for PVA 27-6-18.xls)	Season & Age	Cross-reference to source
Gannet	764 collisions	Annual, all ages	<p>Table 4, Appendix 9.3</p> <p>Tables 2.12 & 2.13 combined, HRA gives total of 724 birds – this total should be 764 collisions – see Table 4, Appendix 9.3. Revised versions of Tables 2.12 & 2.13 and associated text are presented in the HRA Erratum section of this document.</p> <p>Tables 9.140 & 9.142 combined, EIAR gives total of 724 birds – this total should be 764 collisions – see Table 4, Appendix 9.3. Revised versions of Tables 9.140 & 9.142 and associated text are presented in the EIAR Erratum section of this document.</p>
Kittiwake	782 collisions	Annual, all ages	Appendix 9.3, Table 5

			Tables 2.30 & 2.32 combined, HRA (783 birds ⁶) Tables 9.146 & 9.148, EIAR (783 birds ⁶)
--	--	--	--

6 Slight difference in total due to rounding of seasonal figures to nearest whole bird

3.5 Additional MS Question 5

Confirm the effect levels that have been assumed for each species and SPA combination in their HRA- do they match those presented in the “scenarios” sheet of the PVA results spreadsheet

3.5.1 NnG Response

The effects levels & SPA combinations for each species match those presented in the “scenarios” sheet of the PVA results spreadsheet (Appendix 9.8).

3.6 Additional MS Question 6

Populate the attached spreadsheet with the requested information, flagging up where in the submitted application documents (e.g. table number) the information is presented.

3.6.1 NnG Response

Marine Scotland supplied an excel spreadsheet requesting summary information from the PVA results. This has been filled in and submitted as part of this response – see NnG 2018 Ornithology Scenarios and effects summary table 27-6-2018.xls spreadsheet.

4 Erratum for Chapter 9, EIAR

The following tables and associated text replace the corresponding tables and text in Chapter 9 of the EIAR.

Cumulative gannet collisions

802 Predicted cumulative gannet mortality in the breeding season (mid-March to September) for the Project and additional collisions based on 2014 consented figures (Scenario Two) is shown in Table 9.140. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%.

Table 9.140: Estimated cumulative number of gannet collisions in the breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on Band Model Option 2 and an avoidance rate of 98.9%

	Band Option 2 all birds	% of SPA population	Band Option 2 adults	% of SPA population
NnG (2017)	93 ± 16.9	0.06	91	0.06
Inch Cape (2014)	405	0.3	396	0.26
Seagreen A (2014)	423	0.3	409	0.27
Seagreen B (2014)	266	0.2	260	0.17
Total	1,187	0.9	1,156	0.76

803 Based on Scenario Two, there will be an estimated 1,187 gannet collisions (adults and immatures) each breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 0.9% of the breeding population (adults) of the key SPA (Forth Islands) (75,259 pairs) (Table 9.8).

804 However, this estimate includes non-breeding immature birds, as well as breeding adults. During the breeding period, for NnG, 97.5% of aged gannets were adults (Appendix 9.2: Table 3). Based on this, 91 collisions at NnG involved adult birds in the breeding season (Table 9.140). For Inch Cape, 97.7% of aged gannets were adults in the breeding season (Appendix 9.4). Based on this, 396 collisions at Inch Cape involved adult birds in the breeding season. For Seagreen A, the proportion of adults from aged birds in the breeding season was 96.7% (Seagreen 2012), which gives a total of 409 adults in the breeding season. For Seagreen B, the proportion of adults in the breeding season was 97.8% (Seagreen 2012), which gives a total of 260 adult collisions in the breeding season.

805 Considering only adult gannets, there will be an estimated 1,156 collisions each breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 0.76% of the breeding population (75,259 pairs) of the key SPA (Forth Islands) (Table 9.8).

806 Based on either Scenario One or Two, it is concluded that cumulative collision mortality impacts at NnG, Inch Cape and Seagreen A & B will have no effect on the breeding SPA population of gannets within mean maximum foraging range in the breeding season. The sensitivity of gannets to collision is assessed as high and the magnitude of any impacts will be negligible. The significance of this impact is therefore assessed to be **negligible** and not significant in EIA terms.

Gannet – non-breeding season (Scenario 2)

813 Predicted cumulative gannet mortality in the autumn (October to November) and spring (December to mid-March) periods of the non-breeding season for the Project and additional collisions based on 2014 consented figures (Scenario Two) is shown in Table 9.142. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%. Estimated collision numbers for NnG were previously presented in Table 9.55 and 9.57. Estimated collision numbers for Inch Cape and the Seagreen projects are presented in Appendix 9.3.

Table 9.142: Estimated cumulative number of gannet collisions in the autumn and spring periods of the non-breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on 54 turbines, Band Model Option 2 and an avoidance rate of 98.9%

	Band Option 2	% of SPA population
Autumn period of non-breeding season (October to November)		
NnG (2017)	7 ± 1.3	0.004
Inch Cape (2014)	18	0.009
Seagreen A (2014)	17	0.009
Seagreen B (2014)	20	0.010
Total	62	0.03
Spring period of non-breeding season (December to mid-March)		
NnG (2017)	7 ± 1.3	0.003
Inch Cape (2014)	13	0.006
Seagreen A (2014)	19	0.008
Seagreen B (2014)	21	0.009
Total	60	0.03
Combined non-breeding season total		
NnG (2017)	14 ± 2.6	0.007
Inch Cape (2014)	31	0.015
Seagreen A (2014)	36	0.017

Seagreen B (2014)	41	0.019
Total	122	0.06

814 Based on Scenario Two, there will be an estimated 62 gannet collisions (adults and immatures) in the autumn period of the non-breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 0.03% of the North Sea and Channel population from the key SPA (191,857 adults and immature birds) in the autumn period of the non-breeding season (Furness, 2015).

815 In the spring period of the non-breeding season, there will be an estimated 60 gannet collisions (adults and immatures), which corresponds to 0.03% of the North Sea and Channel population from the key SPA (226,482 adults and immature birds) in the spring period of the non-breeding season (Furness, 2015).

816 Overall, there will be an estimated 122 gannet collisions (adults and immatures), which corresponds to 0.06% of the North Sea and Channel population from the key SPA (Forth Islands) in the autumn and spring periods of the non-breeding season (Furness, 2015). This assessment is precautionary as it assumes that gannets from other colonies outside of the Forth Islands SPA do not occur in the Wind Farm Area during the non-breeding period.

817 Based on either Scenario One or Two, it is concluded that cumulative collision mortality impacts at NnG, Inch Cape and Seagreen A & B will have no effect on the breeding SPA population of gannets within mean maximum foraging range in the non-breeding season. The sensitivity of gannets to collision is assessed as high and the magnitude of any impacts will be negligible. The significance of this impact is therefore assessed to be **negligible** and not significant in EIA terms.

Cumulative kittiwake collisions in the breeding season

827 Predicted cumulative kittiwake mortality in the breeding season (mid-April to August) for the Project and additional collisions based on 2014 consented figures (Scenario Two) is shown in Table 9.146. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%. Estimated collision numbers for NnG were previously presented in Table 9.63. Estimated collision numbers for Inch Cape and the Seagreen projects are presented in Appendix 9.3.

Table 9.146: Estimated cumulative number of kittiwake collisions in the breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on Band Model Option 2 and an avoidance rate of 98.9% ± 2 SD

	Band Option 2 all birds	% of SPA population	Band Option 2 adults	% of SPA population
NnG (2017)	9 ± 1.6	0.02	8	0.01
Inch Cape (2014)	291	0.5	266	0.5
Seagreen A (2014)	126	0.2	122	0.2
Seagreen B (2014)	135	0.2	131	0.2
Total	561	1.0	527	0.9

828 Based on Scenario Two, there will be an estimated 561 kittiwake collisions (adults and immatures) each breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 1.0% of the breeding population (adults) for the four key SPAs (29,134 pairs), based on breeding colony counts (Table 9.8).

829 However, this estimate includes non-breeding immature birds, as well as breeding adults. During the breeding period, for NnG, 93.2% of aged kittiwakes were adults (Appendix 9.2: Table 5) Based on this, eight collisions at NnG involved adult birds in the breeding season (Table 9.146). For Inch Cape, 91.3% of aged kittiwakes were adults in the breeding season (Appendix 9.4). Based on this, 266 collisions at Inch Cape involved adult birds in the breeding season. For Seagreen, as 97.2% of all birds recorded on baseline surveys in Seagreen B in June were adults (Seagreen 2012), this ratio was applied to the above figures for both Seagreen projects. This gave a total of 122 adult collisions for Seagreen A and 131 adults for Seagreen B in the breeding season.

830 Considering only adult kittiwakes, there will be an estimated 527 collisions each breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 0.9% of the breeding population (adults) for the four key SPAs (29,134 pairs), based on breeding colony counts (Table 9.8).

831 Based on either Scenario One or Two, it is concluded that cumulative collision mortality impacts at NnG, Inch Cape and Seagreen A & B will have no effect on the breeding SPA population of kittiwakes within mean maximum foraging range in the breeding season. The sensitivity of kittiwakes to collision is assessed as high and the magnitude of any impacts will be negligible. The significance of this impact is therefore assessed to be **negligible** and not significant in EIA terms.

Kittiwake – non-breeding season

832 The non-breeding season for kittiwake was defined in the Scoping Opinion as Autumn – September to December; and Spring – January to mid-April (Table 9.7) (Marine Scotland, 2017). In the BDMPS review, the non-breeding season was defined as Autumn migration (August to December), and Spring migration (January to April) (Furness 2015). Although there are slight differences in these definitions, it was considered these would not make a significant difference to the assessment, and so the Scoping Opinion definitions were followed.

833 Predicted cumulative kittiwake mortality in the autumn and spring periods of the non-breeding season for the Project and additional collisions based on 2017 proposed turbine figures for Inch Cape, Seagreen A and Seagreen B (Scenario One) is shown in Table 9.147. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%. Estimated collision numbers for NnG were previously presented in Table 9.63. Estimated collision numbers for Inch Cape and the Seagreen projects are presented in Appendix 9.3.

834 Based on Scenario One, there will be an estimated 191 kittiwake collisions (adults and immatures) in the autumn period of the non-breeding season, assuming all four Forth and Tay projects are built to this scenario. This corresponds to 0.4% of the North Sea population from the key SPAs (54,039 adults and immature birds) in the autumn period of the non-breeding season (Furness, 2015) (Table 9.18).

835 In the spring period of the non-breeding season, there will be an estimated 88 kittiwake collisions (adults and immatures), which corresponds to 0.2% of the North Sea population from the key SPAs (49,044 adults and immature birds) in the spring period of the non-breeding season (Furness, 2015) (Table 9.21).

836 Overall, there will be an estimated 279 kittiwake collisions (adults and immatures), which corresponds to 0.6% of the North Sea population from the key SPAs in the autumn and spring periods of the non-breeding season (Furness, 2015). This assessment is precautionary as it assumes that kittiwakes from other colonies outside of these four SPAs do not occur in the Wind Farm Area during the non-breeding period.

837 Based on Scenario One (2017 design scenarios), it is concluded that cumulative collision mortality impacts at NnG, Inch Cape and Seagreen Phase 1 will have no effect on the breeding SPA population of kittiwakes within mean maximum foraging range in the non-breeding season. The sensitivity of kittiwakes to collision is assessed as high and

the magnitude of any impacts will be negligible. The significance of this impact is therefore assessed to be **minor** and not significant in EIA terms.

Table 9.147: Estimated cumulative number of kittiwake collisions in the autumn and spring periods of the non-breeding season for Scenario One: NnG (2017 design) and proposed Forth and Tay Wind Farms (2017 design), based on Band Model Option 2 and an avoidance rate of 98.9%

	Band Option 2	% of SPA population
Autumn period of non-breeding season (September to December)		
NnG (2017)	17 ± 3.1	0.03
Inch Cape (2017)	30 ± 5.5	0.06
Seagreen A & B (2017)	144 ± 27.4	0.3
Total	191 ± 36.0	0.4
Spring period of non-breeding season (January to mid-April)		
NnG (2017)	2 ± 0.3	0.004
Inch Cape (2017)	6 ± 1.2	0.01
Seagreen A & B (2017)	80 ± 14.5	0.2
Total	88 ± 16.0	0.2
Combined non-breeding season total		
NnG (2017)	19 ± 3.4	0.034
Inch Cape (2017)	36 ± 6.7	0.07
Seagreen A & B (2017)	224 ± 41.9	0.5
Total	279 ± 52.0	0.6

838 Predicted cumulative kittiwake mortality in the autumn and spring periods of the non-breeding season for the Project and additional collisions based on 2014 consented figures (Scenario Two) is shown in Table 9.148. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%. Estimated collision numbers for NnG were previously presented in Table 9.63. Estimated collision numbers for Inch Cape and the Seagreen projects are presented in Appendix 9.3.

839 Based on Scenario Two, there will be an estimated 541 kittiwake collisions (adults and immatures) in the autumn period of the non-breeding season, assuming all four Forth and Tay projects are built to this scenario. This

corresponds to 0.9% of the North Sea population from the key SPAs (54,039 adults and immature birds) in the autumn period of the non-breeding season (Furness, 2015) (Table 9.18).

840 In the spring period of the non-breeding season, there will be an estimated 225 kittiwake collisions (adults and immatures), which corresponds to 0.4% of the North Sea population from the key SPAs (49,044 adults and immature birds) in the spring period of the non-breeding season (Furness, 2015) (Table 9.21).

Table 9.148: Estimated cumulative number of kittiwake collisions in the autumn and spring periods of the non-breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on Band Model Option 2 and an avoidance rate of 98.9%

	Band Option 2	% of SPA population
Autumn period of non-breeding season (September to December)		
NnG (2017)	17 ± 3.1	0.03%
Inch Cape (2014)	184	0.3
Seagreen A (2014)	217	0.4
Seagreen B (2014)	123	0.2
Total	541	0.9
Spring period of non-breeding season (January to mid-April)		
NnG (2017)	2 ± 0.3	0.004%
Inch Cape (2014)	41	0.08
Seagreen A (2014)	78	0.2
Seagreen B (2014)	104	0.2
Total	225	0.5
Combined non-breeding season total		
NnG (2017)	19 ± 3.4	0.034
Inch Cape (2014)	225	0.4
Seagreen A (2014)	295	0.6
Seagreen B (2014)	227	0.4

Total	766	1.4
--------------	-----	-----

841 Overall, there will be an estimated 766 kittiwake collisions (adults and immatures), which corresponds to 1.4% of the North Sea population from the key SPAs in the autumn and spring periods of the non-breeding season, based on the BDMPs review (Furness, 2015). This assessment is precautionary as it assumes that kittiwakes from other colonies outside of these four SPAs do not occur in the Wind Farm Area during the non-breeding period.

842 Based on Scenario Two (2014 consent scenarios), it is concluded that cumulative collision mortality impacts at NnG, Inch Cape and Seagreen A & B will have a moderate effect on the breeding SPA population of kittiwakes within mean maximum foraging range in the non-breeding season. The sensitivity of kittiwakes to collision is assessed as high and the magnitude of any impacts will be low. The significance of this impact is therefore assessed to be **moderate** and **significant** in EIA terms.

5 Erratum for HRA

The following tables and associated text replace the corresponding tables and text in the HRA document.

Cumulative gannet collisions

171 Based on Scenario Two, there will be an estimated 1,187 gannet collisions (adults and immatures) each breeding season, assuming all four Forth and Tay projects are built to this scenario, of which 1,156 birds will be adults (Table 2-12).

Table 2.12: Estimated in-combination number of gannet collisions in the breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on Band Model Option 2 and an avoidance rate of 98.9%

Project	Band Option 2 all birds	Band Option 2 adults
NnG (2017)	93 ± 16.9	91
Inch Cape (2014)	405	396
Seagreen A (2014)	423	409
Seagreen B (2014)	266	260
Total	1,187	1,156

172 During the non-breeding season an estimated 63 gannets (adult and immature) will be impacted based on Scenario One and 122 under Scenario Two (Table 2.13). The combined total number of gannets (breeding season adults and non-breeding season all birds) estimated to be impacted from collisions is 583 under Scenario One and 1,278 under Scenario Two (Table 2.14).

Table 2.13: Estimated in-combination number of gannet collisions in the non-breeding season for Scenario One and Scenario Two based on Band Model Option 2 and an avoidance rate of 98.9%

Project	Scenario One	Scenario Two
NnG (2017)	14 ± 2.6	14 ± 2.6
Inch Cape (2017)	10 ± 2.1	
Seagreen Phase 1 (2017)	39 ± 7.0	-
Inch Cape (2014)		31
Seagreen A (2014)	-	36
Seagreen B (2014)	-	41

Total	63 ± 11.7	122
--------------	-----------	-----

Table 2.14: Estimated annual in-combination number of gannet collisions for Scenario One and Scenario Two based on Band Model Option 2 and an avoidance rate of 98.9%

Project	Scenario One	Scenario Two
NnG (2017)	105	105
Inch Cape (2017)	122	-
Seagreen Phase 1 (2017)	356	-
Inch Cape 2014		427
Seagreen A (2014)	-	445
Seagreen B (2014)	-	301
Total	583	1,278

Kittiwake in-combination collision impacts

201 Predicted in-combination kittiwake mortality in the breeding season (mid-April to August) for the Project and additional collisions based on 2017 proposed turbine figures for Inch Cape, Seagreen Phase 1 (Scenario One) is shown in Table 2.29. Predicted in-combination kittiwake mortality in the breeding season for the Project and additional collisions based on 2014 proposed turbine figures for Inch Cape, Seagreen Phase 1 (Scenario One) is shown in Table 2.30. This is based on the Project worst case scenario (54 turbines), Band Model Option 2 and an avoidance rate of 98.9%. Estimated collision numbers for NnG were previously presented in Table 2-9. Estimated collision numbers for Inch Cape and the Seagreen projects are presented in EIAR Appendix 9.3.

Table 2.29: Estimated in-combination number of kittiwake collisions in the breeding season for Scenario One: NnG (2017 design) and proposed Forth and Tay Wind Farms (2017 design), based on Band Model Option 2 and an avoidance rate of 98.9%

Project	Band Option 2 all birds	Band Option 2 adults
NnG (2017)	9 ± 1.6	8
Inch Cape (2017)	43 ± 7.9	39
Seagreen Phase 1 (2017)	119 ± 21.7	116
Total	171 ± 31.2	163

Table 2.30: Estimated in-combination number of kittiwake collisions in the breeding season for Scenario Two: NnG (2017 design) and previously consented Forth and Tay Wind Farms (2014 design), based on Band Model Option 2 and an avoidance rate of 98.9% ± 2 SD

Project	Band Option 2 all birds	Band Option 2 adults
NnG (2017)	9 ± 1.6	8
Inch Cape (2014)	291	266
Seagreen A (2014)	126	122
Seagreen B (2014)	135	131
Total	561	527

202 It is estimated that up to 171 and 561 kittiwakes may be impacted each breeding season from the Project and Inch Cape and Seagreen projects depending on the in-combination Scenario, of which 163 and 527 birds will be adults.

203 Apportioning the potential impacts from each of the Projects across the relevant SPAs it is estimated that based on the worst case scenario, i.e. Scenario Two, that of the 527 adult kittiwakes estimated to be impacted during the breeding season, 43 will be from the Forth Islands SPA, 165 will be from Fowlsheugh, 15 will be St Abb’s Head to Fast Castle SPA, 31 from Buchan Ness to Collieston Coast SPA and 272 will be from other non-SPA colonies (Table 2.31).

Table 2.31: Estimated number of adult kittiwakes impacted by collision during the breeding season based on worst-case scenario (Scenario 2).

Project	Forth Islands	Fowlsheugh	St Abb’s Head to Fast Castle	Buchan Ness to Collieston Coast	Other Colonies
NnG (2017)	3.79	0.62	0.79	0.24	2.55
Inch Cape (2014)	27.74	66.01	8.36	12.95	150.95
Seagreen A (2014)	5.75	47.40	3.00	8.77	57.08
Seagreen B (2014)	6.18	50.89	3.22	9.41	61.29
Total	43.47	164.92	15.37	31.37	271.87

204 During the non-breeding season, an estimated 286 kittiwakes (adult and immature) will be impacted based on Scenario One and 766 under Scenario Two (Table 2.32).

Table 2.32: Estimated in-combination number of kittiwake collisions in the non-breeding season for Scenario One and Scenario Two based on Band Model Option 2 and an avoidance rate of 98.9%

Project	Scenario One	Scenario Two
NnG (2017)	19 ± 3.4	19 ± 3.4
Inch Cape (2017)	36 ± 6.7	-
Seagreen Phase 1 (2017)	231 ± 41.9	-
Inch Cape (2014)	-	225
Seagreen A (2014)	-	295
Seagreen B (2014)	-	227
Total	286 ± 52.0	766

Razorbill in-combination displacement impacts

255 The results from apportioning the potential impacts across the three SPAs that are within the mean maximum foraging range of breeding razorbills, i.e. Forth Islands, Fowlsheugh, St Abb’s Head to Fast Castle are presented in Table 2.54.

Table 2.54: Estimated number of adult razorbills at risk of displacement level impacts during breeding season

Project	Forth Islands	Fowlsheugh	St Abb’s Head to Fast Castle
NnG	2.83	0.31	0.55
Inch Cape	4.77	7.47	1.35
Seagreen A	0.73	3.95	0.36
Seagreen B	0.21	1.13	0.10
Total	8.54	12.86	2.36

256 The results indicate that during the breeding season an in-combination displacement impact could cause the loss of nine birds at the Forth Islands SPA, 13 birds at Fowlsheugh SPA and two birds at St Abb’s Head to Fast Castle SPA.

Appendix A: Comparison of revised PVA model runs for guillemot and razorbill