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MONA OFFSHORE WIND PROJECT

Offshore ornithology supporting information in line with SNCB advice

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Image of an offshore wind farm

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Glossary

Term	Meaning
Applicant	Mona Offshore Wind Limited.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets, offshore and onshore transmission assets, and associated activities.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects.

Acronyms

Acronym	Description
AEoSI	Adverse effect on site integrity
BDMPS	Biologically Defined Minimum Population Scales
EIA	Environmental Impact Assessment
ExA	Examining Authority
HRA	Habitats Regulations Assessment
JNCC	Joint Nature Conservation Committee
LCI	Lower confidence interval
NRW	Natural Resources Wales
PVA	Population Viability Analysis
SNCB	Statutory Nature Conservation Body
SPAs	Special Protection Areas
SSSI	Site of Special Scientific Interest
UCI	Upper confidence interval
UK	United Kingdom

Units

Unit	Description
%	Percentage
km^2	Square kilometres
km	Kilometres
m	Metres

1 OFFSHORE ORNITHOLOGY SUPPORTING INFORMATION IN LINE WITH SNCB ADVICE

1.1 Introduction

1.1.1.1 The Applicant notes that Natural Resources Wales (Advisory) (NRW(A)) and the Joint Nature Conservation Committee (JNCC) have made relevant representations (RR-011 and RR-033, respectively) and written representations (REP1-056; REP1-066/REP1-067, respectively) regarding their ability to follow the assessment approach presented in the Habitat Regulations Assessment (HRA) and Environmental Impact Assessment (EIA) application materials. For example, NRW(A) (RR-011, page 6) stated that "*Whilst we consider that the likely significant effects from the project alone will not result in Adverse Effect on Site Integrity (AEoSI), the assessment and process of reaching the predicted Document Reference: S_D2_2 5 impacts in the HRA Stage 1 Screening Report [APP-034] and HRA Stage 2 Information to Support an Appropriate Assessment (ISAA) Special Protection Areas (SPAs) and Ramsars [APP-033] is currently difficult to follow and unclear in places*." The Applicant appreciates that the information supporting the HRA and EIA is distributed across several application documents.

1.1.1.2 Furthermore, the Applicant notes that NRW(A) and the JNCC have highlighted in their relevant representations (RR-011 and RR-033, respectively) and written representations (REP1-056; REP1-066/REP1-067, respectively) several instances where they do not consider the Applicant's EIA and HRA to have been undertaken in accordance with their advice with respect to the methodologies and input parameters used. The Applicant has responded to specific points raised by NRW(A) and the JNCC in the Applicant's Response to Relevant Representations (PDA-008; see rows RR-011.13 and RR-033.5) and the Applicant's Response to NRW (A) Written Representations (REP2-080; see rows REP1-056.89 - REP1-056.101) and JNCC Written Representations (REP2-081: see rows REP1-066.2, REP1-066.39 - REP1-066.41).

1.1.1.3 Under Rule 17 of the Infrastructure Planning (Examination Procedure) Rules 2010 (as amended), the Examining Authority (ExA) has requested that an assessment of effects on ornithological features (for both the EIA and HRA) using the methods and parameters highlighted by NRW(A) and JNCC during pre-application consultation, and in their relevant representation (RR-011; RR-033) and written representations (REP1-056; REP1-066/REP1-067) should be submitted by Deadline 3.

1.1.1.4 The Applicant wishes to highlight that extensive consultation was undertaken with NRW, the JNCC and Natural England during the pre-application phase via the Evidence Plan Process (EPP), including on methodological approaches and input parameters to seek agreement on the Applicant's approach where possible. This is detailed in the Technical Engagement Plan (APP-041) and Annex D of the Technical Engagement Plan Appendices Part 1 (A to E) (APP-042). Through these discussions, it was not possible to discuss and agree on all aspects of the methodologies.

1.1.1.5 A summary of relevant representations and written representations post-application consultation is presented in Table 1.1 alongside how the comments have been considered by the Applicant.

Table 1.1: Post-application consultation and engagement relevant to the supporting information presented within this technical note

Consultee and reference to comment	Comment summary	Response to issue raised and/or where considered in this technical note
NRW (A) relevant representations (Applicant's Response to Relevant Representations (PDA-088); see row RR-011.13)	NRW(A) notes that the Applicant's approach and presentation of apportionment of predicted impacts is, in places, difficult to follow and unclear. NRW(A) require clarification (potentially to include a full worked example for a species and site of all apportioning (age classes and apportionment of impacts)) and/or updates to the assessment are required.	This supporting information technical note brings together the key assessment information in a single document, with clear signposting to the source of this information and where further supporting details can be found within the application documents.
JNCC relevant representations (Applicant's Response to Relevant Representations (PDA-088); see row RR-033.5)	JNCC notes that many aspects of the assessment are difficult to follow what has been done or where values have come from.	
NRW (A) written representations (Appendix to Response to WRs: NRW (REP2-080); see rows REP1-056.88 - REP1-056.101)	NRW (A) highlighted that they would base their advice and conclusions on assessments that consider the full range of advised displacement and mortality rates that follow SNCB guidance. As the apportioned impacts across the full range of advised displacement and mortality rates are currently not available for each designated site in the HRA Stage 1 Screening Report (REP2-012) or HRA Stage 2 Information to Support Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010), they therefore suggest that the Applicant provides this information into the examination as soon as possible. NRW (A) highlighted that they are not advising that the HRA be based solely on the upper end of the % displacement and % mortality rates advised (e.g. 70% displacement and 10% mortality for auks), but advises that in order to account for the large degree of uncertainty regarding displacement rates and effects that the assessments consider a range of potential rates and effects rather than focussing on a single figure as the Applicant has done in their HRA application documents.	This technical note (section 1.5.1) includes presentation of displacement impacts apportioned to designated sites for the full range of displacement and mortality rates recommended by the SNCBs (including those outlined in REP1-056.88 to REP1-056.101) to aid the SNCB's interpretation of the apportioned impacts on individual SPAs.
JNCC written representations (Appendix to Response to WRs: JNCC (REP2-081); see row REP-066.2)	JNCC notes that some aspects of JNCC advice also appear to have been taken on board in some circumstances but not in others, despite agreement during pre-application meetings and correspondence. For instance, specific displacement rates being used in the HRA and EIA.	

Consultee and reference to comment	Comment summary	Response to issue raised and/or where considered in this technical note
JNCC written representations (Appendix to Response to WRs: JNCC (REP2-081(; REP1-066.39 - REP1-066.41)	JNCC do not agree that single values of displacement and mortality should be used for analysis of population impacts. JNCC advises that a range of displacement mortality values are taken through to the assessment of population impacts (SNCBs, 2022).	
NRW's written feedback following a meeting on 9 September 2024 (received via email on 18 September 2024)	NRW (A) advised that the presentation of apportioned impact should include the following: – age class apportioning as well as apportioning value to colony. – the mortality rate and data source (assume will be based on adult survival rates from Horswill and Robinson 2015)). – the figures for the annual summed total impacts as well as per season.	These parameters are presented for each species and SPA in section 1.5.1 and section 1.5.2.
	NRW (A) advise that where the Mona Offshore Wind Project's predicted impact equates to greater than 0.05% baseline mortality at any point within the advised range of displacement and mortality rates, then the site/feature combination is taken through to in-combination assessment and not just based on the Applicant's identified % displacement and % mortality rates, as has been currently done.	The in-combination assessments based on the advised range of displacement and mortality rates are presented in Section 1.5.3.
	NRA (A) suggest for the apportioned impacts (when using the full range of displacement scenarios) the presentation of tables showing predicted impacts across range and highlighting where within the range 1% baseline mortality is exceeded.	The Applicant notes that this could be useful if multiple scenarios are being presented, however this note focuses on the range of displacement and mortality rates requested by the SNCBs. The worst-case scenario is presented in-combination and within the PVAs which show no detrimental impact on the assessed populations and therefore the tables are not presented as do not add additional clarity to this point.
JNCC's written feedback following a meeting on 4 September 2024 (received via email on 10 September 2024)	The JNCC recommends that the presentation of collision impacts within the EIA includes the following information: – Site – Population – Baseline mortality – Mean collision mortality (lower confidence interval (LCI) and upper confidence interval (UCL)) (per bio-season) – Increase in baseline mortality mean (LCL, UCL) (per bio-season)	These parameters are presented for each species in section 1.4.1.

Consultee and reference to comment	Comment summary	Response to issue raised and/or where considered in this technical note
	The JNCC recommends that the presentation of apportioned displacement impacts within the HRA includes the following information: - Site - Colony count (Year) - Baseline mortality - Un-apportioned mortalities (per bio-season) - Age-class apportioning (per bio-season) - Apportioning value (per bio-season) - Impact range (per bio-season) - Increase in baseline mortality (per bio-season)	These parameters are presented for each species and SPA in section 1.5.1 for displacement impacts. The un-apportioned mortalities are presented fully within Table 1.3 and repeated before each results table in section 1.5.1.
	The JNCC recommend the presentation of apportioned collision impacts within the HRA includes the following information: - Site - Colony count (year) - Baseline mortality - Un-apportioned mean collision mortality (LCL, UCL) (per bio-season) - Age-class apportioning (per bio-season) - Apportioning value (per bio-season) - Apportioned mean collision mortality (LCL, UCL) (per bio-season) - Increase in baseline mortality mean (LCL, UCL) (per bio-season)	These parameters are presented for each species and SPA in section 1.5.2. The un-apportioned mortalities are presented fully within Table 1.3 and repeated before each results table in section 1.5.2.

1.1.1.6 In response to the Examining Authority's Rule 17 (PD-012) letter and NRW's and the JNCC's relevant representations (RR-011 and RR-033, respectively) and written representations (REP1-056; REP1-066/REP1-067, respectively), the Applicant has sought to present the EIA and HRA requested information in accordance with the SNCBs' advice alongside the Applicant's identified approach (based on an assessment of available evidence and those approaches used by other recently consented offshore wind farms) for determining impacts in the Environmental Statement and the HRA.

1.1.1.7 This technical note brings together the key assessment information provided in the development consent order (DCO) application, with clear signposting to the source of this information and where further supporting details can be found within the application documents. In addition, this technical note provides supporting information requested in NRW's and the JNCC's representations made in the examination of the Mona Offshore Wind Project to date.

1.1.1.8 This supporting information is intended to give the SNCBs the information required to provide confidence that the EIA and HRA conclusions are robust. It is also intended to provide sufficient understanding of the potential impacts of the Mona Offshore Wind Project (alone and cumulatively/in-combination with other plans and projects) for the

SNCBs to confirm their position with respect to a conclusion of no significant effects and AEoSI beyond reasonable scientific doubt.

1.1.1.9 As outlined in Table 1.1 above, the Applicant has engaged with the JNCC and NRW on the scope and presentation of this supporting information note to ensure this sufficiently addresses the SNCBs concerns and the Examining Authority's Request for Further Information – Rule 17 (PD-012/PD-012a).

1.1.2 Considerations

1.1.2.1 The Applicant has worked to produce the numeric outputs requested by NRW(A) and the JNCC in relation to the ornithological assessments for the Mona Offshore Wind Project.

1.1.2.2 Available evidence suggests that the upper ranges of displacement and mortality rates (e.g. 70% displacement and 10% mortality) may be excessively precautionary (e.g. MacArthur Green, 2023; APEM, 2022; Peschko *et al*., 2020; Vanermen *et al*., 2016; Leopold *et al*., 2013). The use of both high levels of displacement and high levels of mortality results in unrealistic outputs that are not supported by the available evidence. Assessments should be pragmatic and robust, but this is being compromised by the introduction of high levels of precaution and using of numbers at the most conservative end of the spectrum (e.g. 70% displacement and 10% mortality). This then compounds through addition, multiplication and modelling to produce modelling outputs that are unrealistic. Given this, the Applicant feels that the viewing of the numbers in this document alone should be balanced with biological considerations and realistic scenarios.

1.1.2.3 The Applicant maintains that a scenario of 50% displacement and 1% mortality is both robust and precautionary for the purposes of the assessment. The Applicant does not consider that the most conservative scenarios presented (i.e. 70% displacement and 10% mortality rate) are a realistic worst-case scenario as this level of impact has not been evidenced at previous offshore wind projects such as Beatrice (reviewed by APEM, 2022). The Applicant also notes that in their written representations, both the JNCC and NRW have stated that they would not base their consideration of impact solely on the top of the range of potential impact.

1.1.3 Structure of this technical note

1.1.3.1 This technical note is set out in the following way, which, in the Applicant's view and following the advice from NRW(A) and the JNCC, provides the flow of information that the SNCBs require to have confidence in the assessments presented. This includes:

- Section 1.1 provides the background to this technical note, its purpose and the consultation the Applicant has done to provide the SNCBs with the confidence that this technical note will provide them the clarity they require.
- Section 1.2 provides a brief summary of what has been included within the submitted EIA and HRA documents and where there is deviation from what the SNCBs have requested to be included. Section 1.2 also clarifies what is presented within the results section (section 1.4).
- Section 1.3 provides information which can be found in the application documents but has been represented within this technical note to show the flow of information required for the updated HRA apportioning. The following sections are included:

  - Section 1.3.2 presents the impacts from the displacement and collision assessments. This information is taken from Volume 6, Annex 5.2: Offshore Ornithology Displacement Technical Report (REP2-018) and Volume 6, Annex 5.3: Offshore Ornithology Collision Risk Modelling Technical Report (REP2-020), respectively.
  - Section 1.3.3 presents the seasonal age-class apportioning taken from the site-specific DAS for the Mona Offshore Wind Project. This information is taken from Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (REP2-022).
  - Section 1.3.3 presents the baseline mortality rates required for each species. This information is taken from Volume 2, Chapter 5: Offshore Ornithology (REP2-016).
  - Section 1.3.5 provides the method by which the apportioning values for each SPA have been calculated. This information is taken from Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (REP2-022). The SPA and species-specific apportioning values are presented in section 1.4.
- Section 1.4 provides the results of presenting the range of impacts from upper and lower confidence intervals at the EIA scale.
- Section 1.5 represents the apportioning results for all SPAs which are included within Appendix A of the HRA Stage 1 Screening Report (REP2-012). Section 1.5 replicates the tables from Appendix A of the HRA Stage 1 Screening Report (REP2-012) but with the added range of impacts as requested by the SNCBs.
  - Section 1.5.1 presents the displacement tables;
  - Section 1.5.2 presents the collision tables; and
  - Section 1.5.3 presents the in-combination tables (if required).
- Section 1.6 provides the PVAs which are required for the project alone or the project in-combination.
- Section 1.7 provides the conclusions when considering the full range of predicted impacts on species and undertaking PVAs when impacts predicted resulted in an increase in baseline mortality of >1%.

1.2 Summary of EIA / HRA information presented at application

1.2.1 Displacement assessment

1.2.1.1 The full range (1 to 100% for both displacement and mortality rates) of predicted displacement impacts are presented within the individual species matrix tables for the project alone within Volume 6, Annex 5.2: Offshore Ornithology Displacement Technical Report (REP2-018).

1.2.1.2 Within these matrix tables, the SNCBs advised displacement and mortality rates (Table 1.2) are included. The increase in mortality when using the SNCBs advised displacement and mortality rates range are taken through to assessment in Volume 2, Chapter 5: Offshore Ornithology (REP2-016) for both the project alone assessment and the cumulative assessment. The Applicant was able to conclude no significant impact alone and cumulatively when using the full range of displacement and mortality rates for all species included in the assessment (Table 5.116 of Volume 2, Chapter 5: Offshore Ornithology (REP2-016)).

1.2.1.3 However, the proportion of the population which may undergo displacement and mortality presented in the HRA Stage 1 Screening (REP2-012) is based on the Applicant's identified displacement and mortality rates (50% displacement and 1% mortality for Atlantic puffin, black-legged kittiwake, common guillemot, Manx shearwater and razorbill and 70% displacement and 1% mortality for northern gannet).

1.2.1.4 The JNCC and NRW disagree with the use of the single value estimates in the HRA Stage 1 Screening (REP2-012) and the HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010) for analysis of likely significant effects and AEoSI (Table 1.1).

1.2.1.5 Therefore, the Applicant has presented further supporting information in this technical note and tabulated the apportioned impacts to SPAs in section 1.5.1 using the range of displacement and mortality values advised by SNCBs (as shown in Table 1.2).

1.2.1.6 The predicted displacement mortalities presented at application within Volume 6, Annex 5.2: Offshore Ornithology Displacement Technical Report (REP2-018) are summarised in Table 1.3 using the range of displacement and mortality rates from Table 1.2. Table 1.8 to Table 1.12 present the apportioned displacement impacts for each SPA considered within the HRA Stage 1 Screening Report (REP2-012).

1.2.1.7 It should be noted that for the auk species (specifically common guillemot and razorbill) an alternative approach of 70% displacement and 2% mortality is presented alongside the minimum impact (30% displacement and 1%) and the maximum impact (70% displacement and 10% mortality), as recently accepted and used by the Secretary of State within the HRAs for Hornsea Two/Three/Four, East Anglia One North, East Anglia Two, Norfolk Boreas, Norfolk Vanguard, Sheringham Shoal and Dudgeon Extension Projects (SEP and DEP).

1.2.1.8 The JNCC was the only SNCB involved in the Expert Working Groups for the Mona Offshore Wind Project that requested the Applicant provide a displacement assessment for black-legged kittiwake. Both NRW(A) and Natural England have stated there is insufficient evidence to undertake a displacement assessment for black-legged kittiwake. As requested by the JNCC, a displacement assessment for black-legged kittiwake is included in this technical note. The evidence that was presented alongside the request for 30-70% displacement and 1-10% mortality (specifically, Peschko *et al*., 2020; Vanermen *et al*., 2016; Leopold *et al*., 2013 within D.3.14 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)) does not support the displacement and mortality rates suggested, with very high variability around the impacts (even some positive effects).

1.2.1.9 Therefore, for black-legged kittiwake, the Applicant is presenting an alternative approach of 30% displacement and 3% mortality which is in line with NatureScot guidance (NatureScot, 2023) and used for recent assessments within Scottish waters (e.g. Ossian Offshore Wind Farm and West of Orkney Wind Farm). Only if the in-combination impact surpasses a >1% increase in baseline mortality when considering 30% displacement and 3% mortality, will a PVA then be presented (section 1.6).

Table 1.2: Displacement and mortality rates advised by the SNCBs and evidence of when this advice was received.

Species	SNCB advised displacement rate range and basis of the Applicant's EIA at application		SNCB advised mortality rates range and basis of the Applicant's EIA at application		Specific request from the SNCBs to use these rates	
	JNCC	NRW	JNCC	NRW	JNCC	NRW
Common guillemot	30 to 70%	30 to 70 %	1 to 10%	1 to 10%	JNCC did not disagree with using these figures as presented in D.3.9 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042).	NRW confirmed that 30-70% displacement and 1-10% mortality for auks following EWG3 in November 2022 (D.4.3 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)).
Razorbill	30 to 70%	30 to 70 %	1 to 10%	1 to 10%		
Atlantic puffin	30 to 70%	30 to 70 %	1 to 10%	1 to 10%		
Black-legged kittiwake	30 to 70%	**No assessment required**	1 to 10%	**No assessment required**	JNCC requested 30-70% displacement and 1-10% mortality in June 2022 (D.3.14 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)).	NRW confirmed that no kittiwake assessment for displacement is required due to an insufficient evidence base (REP1-056).
Manx shearwater	30 to 70%	30 to 70%	1 to 10%	1 to 10%	JNCC initially requested 1-10% displacement and 1-10% mortality in June 2022 (D.3.14 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)). This then changed to 'whole matrices' (D.4.4 in Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042))	NRW initially stated '*there is currently no evidence for any particular range of displacement rates (1-10%, 30-70% or any other) for this species from offshore wind farms. NRW (A) welcome that the whole matrices will be presented in the PEIR.* (D.4.3 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042). Within their Written Representations (REP1-056), it was requested that 30-70% displacement and 1-10% mortality (as with auks) be used (REP1-056).

Species	SNCB advised displacement rate range and basis of the Applicant's EIA at application		SNCB advised mortality rates range and basis of the Applicant's EIA at application		Specific request from the SNCBs to use these rates	
	JNCC	NRW	JNCC	NRW	JNCC	NRW
Northern gannet	60 to 80%	1 to 10%	1 to 10%	1 to 10%	JNCC did not disagree with using these figures as presented in D.3.9 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)	NRW confirmed that 60-80% displacement and 1-10% mortality for auks following EWG3 in November 2022 (D.4.3 of Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)) was appropriate.

1.2.2 Collision risk assessment

1.2.2.1 Whilst the range of predicted collision impacts using 95% lower confidence interval (LCI) and upper confidence intervals (UCI) are presented within Volume 6, Annex 5.3: Offshore Ornithology Collision Risk Modelling Technical Report (REP2-020), the estimated increase in baseline mortalities in Volume 2, Chapter 5: Offshore Ornithology (REP2-016) is solely based on the mean collision mortality.

1.2.2.2 Similarly to displacement, the collision mortalities presented in the HRA Stage 1 Screening (REP2-012) also used a single value estimate (mean collision mortality).

1.2.2.3 The JNCC and NRW disagree with the use of single value estimates in the HRA Stage 1 Screening (REP2-012) and HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010) for analysis of impacts on SPAs (Table 1.1).

1.2.2.4 Therefore, as recommended by the JNCC and NRW, the Applicant has presented further supporting information in this technical note. The range of predicted collision impacts presented at application (within Volume 6, Annex 5.3: Offshore Ornithology Collision Risk Modelling Technical Report (REP2-020)), at the EIA population scale, including the LCI and UCI, is presented in Table 1.6. The Applicant has populated the apportioned impacts to SPAs using the LCI and UCI in Table 1-13 to Table 1-17.

1.3 Information required to present impacts using a range-based approach

1.3.1.1 The following information is required to present impacts using a range-based approach including the apportioned impacts on SPAs (as presented within Appendix A of the HRA Stage 1 Screening Report (REP2-012)).

1.3.2 Project alone collision and displacement impacts

1.3.2.1 Table 1.3 presents the project alone predicted impacts from collision, displacement and collision and displacement combined (where required) for each species considered within this technical note. The information is taken from Volume 6, Annex 5.2: Offshore Ornithology Displacement Technical Report (REP2-018) and Volume 6, Annex 5.3: Offshore Ornithology Collision Risk Modelling Technical Report (REP2-020), respectively.

1.3.2.2 The predicted mortalities from displacement are presented for the Applicant's identified rates (50% displacement and 1% mortality), followed by the SNCBs advised range of displacement and mortality rates in brackets (see Table 1.2 for further information).

1.3.2.3 The mortalities from collisions are presented with the mean value outside the brackets and the LCI and UCIs in brackets.

1.3.2.4 These predicted mortalities estimates feed into the assessment tables presented in section 1.5.1 for displacement and section 1.4.1 and 1.5.2 for collisions.

Table 1.3: Predicted collision and displacement impacts during the operations and maintenance phase (all age classes).

Species	Season	Mortality - Collisions (using species-group avoidance rates)[1]	Mortality - Collisions (using species-specific avoidance rates)[2]	Mortality - Displacement (see Table 1.2 for species-specific rates presented)[3]	Mortality - Combined (using species-group avoidance rates)[1]	Mortality - Combined (using species-specific avoidance rates)[2]
Common guillemot	Breeding (March to July)	n/a	n/a	21 (13 to 295)	21 (13 to 295)	21 (13 to 295)
	Non-breeding (August to February)	n/a	n/a	19 (11 to 263)	19 (11 to 263)	19 (11 to 263)
Razorbill	Pre-breeding migration (January to March)	n/a	n/a	10 (6 to 135)	10 (6 to 135)	10 (6 to 135)
	Breeding (April to July)	n/a	n/a	0 (0 to 6)	0 (0 to 6)	0 (0 to 6)
	Post-breeding migration (August to October)	n/a	n/a	0 (0 to 6)	0 (0 to 6)	0 (0 to 6)
	Non-breeding (November to December)	n/a	n/a	2 (1 to 29)	2 (1 to 29)	2 (1 to 29)
Atlantic puffin	Breeding (April to August)	n/a	n/a	0 (0 to 1)	0 (0 to 1)	0 (0 to 1)
	Non-breeding (September to March)	n/a	n/a	0 (0 to 2)	0 (0 to 2)	0 (0 to 2)
Northern gannet (collisions corrected for 70% macro avoidance[4])	Pre-breeding (December to February)	0 (0 to 0)	n/a	0 (0 to 2)	0 (0 to 2)	n/a
	Breeding (March to September)	1 (0 to 4)	n/a	2 (2 to 20)	3 (2 to 24)	n/a
	Post-breeding (October to November)	0 (0 to 0)	n/a	0 (0 to 5)	0 (0 to 5)	n/a
Northern fulmar	Pre-breeding (December)	0 (0 to 0)	n/a	n/a	0 (0 to 0)	n/a

Species	Season	Mortality - Collisions (using species-group avoidance rates)[1]	Mortality - Collisions (using species-specific avoidance rates)[2]	Mortality - Displacement (see Table 1.2 for species-specific rates presented)[3]	Mortality - Combined (using species-group avoidance rates)[1]	Mortality - Combined (using species-specific avoidance rates)[2]
	Breeding (January to August)	0 (0 to 2)	n/a	n/a	0 (0 to 2)	n/a
	Post-breeding (September to October)	0 (0 to 0)	n/a	n/a	0 (0 to 0)	n/a
	Non-breeding (November)	0 (0 to 0)	n/a	n/a	0 (0 to 0)	n/a
Black-legged kittiwake	Pre-breeding (January to February)	9 (3 to 18)	3 (1 to 5)	3 (2 to 40)	12 (5 to 58)	6 (3 to 45)
	Breeding (March to August)	16 (6 to 32)	5 (2 to 9)	4 (2 to 51)	20 (8 to 83)	9 (4 to 60)
	Post-breeding (September to December)	8 (3 to 18)	3 (1 to 5)	3 (2 to 39)	12 (5 to 57)	6 (3 to 44)
Herring gull	Breeding (March to August)	0 (0 to 0)	0 (0 to 0)	n/a	0 (0 to 0)	0 (0 to 0)
	Non-breeding (September to February)	1 (1 to 3)	1 (0 to 3)	n/a	1 (1 to 3)	1 (0 to 3)
Lesser black-backed gull	Pre-breeding (March)	1 (0 to 2)	1 (0 to 1)	n/a	1 (0 to 2)	1 (0 to 1)
	Breeding (April to August)	0 (0 to 1)	0 (0 to 1)	n/a	0 (0 to 1)	0 (0 to 1)
	Post-breeding (September to October)	0 (0 to 0)	0 (0 to 0)	n/a	0 (0 to 0)	0 (0 to 0)
	Non-breeding (November to February)	1 (0 to 2)	1 (0 to 1)	n/a	1 (0 to 2)	1 (0 to 2)
Great black-backed gull	Breeding (March to August)	2 (1 to 3)	0 (0 to 1)	n/a	2 (1 to 3)	0 (0 to 1)

Species	Season	Mortality - Collisions (using species-group avoidance rates)[1]	Mortality - Collisions (using species-specific avoidance rates)[2]	Mortality - Displacement (see Table 1.2 for species-specific rates presented)[3]	Mortality - Combined (using species-group avoidance rates)[1]	Mortality - Combined (using species-specific avoidance rates)[2]
	Non-breeding (September to February)	3 (1 to 7)	0 (0 to 1)	n/a	3 (1 to 7)	0 (0 to 1)
Manx shearwater	Pre-breeding (March)	0 (0 to 0)	n/a	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)
	Breeding (April to August)	0 (0 to 0)	n/a	6 (4 to 87)	6 (4 to 87)	6 (4 to 87)
	Post-breeding (September to October)	0 (0 to 0)	n/a	0 (0 to 1)	0 (0 to 1)	0 (0 to 1)

[1] Species-group avoidance rates are 0.9928 for black-legged kittiwake, northern fulmar, northern gannet and Manx shearwater and 0.9939 for great black-backed gull, herring gull and lesser black-backed gull. The number outside the brackets is the mean predicted impact with the LCI and UCI presented in the brackets.

[2] Species-specific avoidance rates are 0.9952 for herring gull, 0.9954 for lesser black-backed gull, 0.9979 for black-legged kittiwake and 0.9991 for great black-backed gull. The number outside the brackets is the mean predicted impact with the LCI and UCI presented in the brackets.

[3] The range of displacement rates used (within the brackets) is presented in Table 1.2. This is 30-70% displacement and 1-10% mortality for Atlantic puffin, common guillemot, razorbill, black-legged kittiwake and Manx shearwater and 60-80% displacement and 1-10% mortality for northern gannet. The figure outside the brackets uses the Applicant's identified rate, which is 50% displacement and 1% mortality for Atlantic puffin, common guillemot, razorbill, black-legged kittiwake and Manx shearwater and 70% displacement and 1% mortality for northern gannet.

[4] The use of 70% macroavoidance has been agreed with the SNCBs (D3.13 of the Technical Engagement Plan Appendices – Part 1 (A to E) (APP-042)). The 70% macroavoidance has been applied to the inputted density estimates.

1.3.3 Seasonal age-class apportioning

1.3.3.1 The age-class apportioning values are presented in Table 1.4 of Volume 6, Annex 5.5: Offshore ornithology apportioning technical report (REP2-022). The Applicant confirms that during the breeding and non-breeding season, age-class was calculated from site-specific DAS, or if age-class identification was not possible from site-specific DAS then it was presumed that 100% of birds were adults.

1.3.3.2 The age-class apportioning values are represented in Table 1.4 to ensure a clear flow information and allow subsequent calculations of apportioned impacts in section 1.5.

1.3.3.3 The age-class apportioning values feed into the assessment tables presented in section 1.5.1 for displacement and section 1.4.1 and 1.5.2 for collisions.

Table 1.4: Seasonal age-class apportioning.

Species	Season	Adult %	Immatures %
Common guillemot	Breeding (March to July)	100%	0%
	Non-breeding (August to February)	100%	0%
Razorbill	Breeding (April to July)	100%	0%
	Non-breeding (August to March)	100%	0%
Northern gannet	Breeding (March to September)	93.58%	6.42%
	Non-breeding (October to February)	96.43%	3.57%
Black-legged kittiwake	Breeding (March to August)	95.36%	4.64%
	Non-breeding (September to February)	92.01%	7.99%
Herring gull	Breeding (March to August)	80.00%	20.00%
	Non-breeding (September to February)	75.61%	24.39%
Lesser black-backed gull	Breeding (April to August)	81.82%	18.18%
	Non-breeding (September to March)	86.96%	13.04%
Great black-backed gull	Breeding (March to August)	83.33%	16.67%
	Non-breeding (September to February)	70.49%	29.51%
Manx shearwater	Breeding (April to August)	100%	0%
	Non-breeding (September to March)	100%	0%

1.3.4 Baseline mortality rates used

1.3.4.1 Whilst the baseline mortality rates were presented in the application in Table 5.15 of Volume 2, Chapter 5: Offshore Ornithology (REP2-016), the Applicant has again presented these rates in this supporting information technical note. This is to ensure a clear flow information and to allow for calculations of subsequent apportioned impacts in section 1.5.

1.3.4.2 These baseline mortality rates feed into the assessment tables presented in section 1.5.1 for displacement and section 1.4 and 1.5.2 for collisions.

Table 1.5: Baseline mortality rates (Horswill and Robinson, 2015).

Species	Age Class Survival Rate						Adult survival rate	Adult mortality rate
	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6		
Common guillemot	0.560	0.792	0.917	0.939	0.939	N/A	0.939	0.061
Razorbill	0.630	0.630	0.895	0.895	N/A	N/A	0.895	0.105
Manx shearwater	0.870	0.870	0.870	0.870	0.870	N/A	0.870	0.130
Northern gannet	0.424	0.829	0.891	0.895	0.895	N/A	0.919	0.081
Black-legged kittiwake	0.790	0.854	0.854	0.854	N/A	N/A	0.854	0.146
European herring gull	0.798	0.834	0.834	0.834	0.834	N/A	0.834	0.166
Lesser black-backed gull	0.820	0.885	0.885	0.885	0.885	N/A	0.885	0.115
Great black-backed gull	0.798	0.930	0.930	0.930	0.930	N/A	0.930	0.070

1.3.5 Apportioning values

1.3.5.1 Whilst the apportioning values for each site and colony are presented in Volume 6, Annex 5.5: Offshore ornithology apportioning technical report (REP2-022), the Applicant has presented these values in this technical note for each SPA and species considered. This is to ensure a clear flow of information and to allow for calculations of apportioned impacts.

1.3.5.2 The apportioning values for each species, from each site during each bio-season are presented within the respective results table within section 1.5.

1.4 Additional EIA information as requested by the SNCBs

1.4.1 Inclusion of LCI and UCI collision impacts at the EIA population scale from the Mona Offshore Wind Project alone

1.4.1.1 Table 1.6 provides the UCI and LCI associated with the mean collision impacts which were presented in Volume 6, Annex 5.3: Offshore Ornithology Collision Risk Modelling Technical Report (REP2-020) but not subsequently assessed within Volume 2, Chapter 5: Offshore Ornithology (REP2-016) for the Mona Offshore Wind Project alone.

1.4.1.2 The population sizes presented Table 1.9 represent the smaller of the two population options, either the 'Foraging range breeding season population' or 'Regional breeding season population'; see Table 5.14 of Volume 2, Chapter 5: Offshore Ornithology (REP2-016) for the differences between the two populations. The SNCBs advised that the 'Regional breeding season population' be presented; however it was agreed during the EPP that the smaller of the 'foraging range' or 'regional' populations could be used as a precaution. The Applicant can confirm that the smaller and, therefore most precautionary population is presented within Table 1.6. Whilst for Manx shearwater and northern gannet, the smallest population is the 'Regional breeding season population', for the rest of the species the 'Foraging range breeding season population' is the smallest population (Table 1.6).

1.4.1.3 Great black-backed gull during the breeding season is the only species which surpasses the >1% increase in baseline mortality (highlighted in bold text and yellow cell colour in Table 1.6) and therefore, a PVA has been presented within section 1.4.2.

1.4.1.4 When considering the range of LCI and UCI, the conclusions presented within Volume 2, Chapter 5: Offshore Ornithology (REP2-016) remain valid with no change in magnitude of effect predicted, even when assessing the UCI, and therefore no change to the overall conclusions.

Table 1.6: Collision risk impacts at an EIA population scale (mean and 95% CIs presented in brackets).

Species	Season	Population	Baseline mortality	Mortality - Collisions when using species-group avoidance rates (LCI and UCI)	Mortality - Collisions when using species-specific avoidance rates (LCI and UCI)	Increase in baseline mortality (%) when using species-group avoidance rate (LCI and UCI)	Increase in baseline mortality (%) when using species-specific avoidance rate (LCI and UCI)
Northern gannet (collisions corrected for 70% macro avoidance)	Pre-breeding (December to February)	661,888	127,744	0.13 (0.04 to 0.33)	n/a	0.000% (0.000% to 0.000%)	n/a
	Breeding (March to September)	522,888	106,707	1.42 (0.28 to 3.94)	n/a	0.001% (0.000% to 0.004%)	n/a
	Post-breeding (October to November)	545,954	105,369	0.15 (0.03 to 0.39)	n/a	0.000% (0.000% to 0.000%)	n/a
	Annual	661,888	127,744	1.70 (0.34 to 4.66)	n/a	0.001% (0.000% to 0.004%)	n/a
Northern fulmar	Breeding (January to August)	828,194	183,031	0.32 (0.00 to 1.94)	n/a	0.000% (0.000% to 0.001%)	n/a
	Pre-breeding (December)	54,403	12,023	0.03 (0 to 0.17)	n/a	0.000% (0.000% to 0.001%)	n/a
	Post-breeding (September to October)	828,194	183,031	No predicted collisions			
	Non-breeding (November)	556,367	122,957	0.01 (0.00 to 0.05)	n/a	0.000% (0.000% to 0.000%)	n/a
	Annual	828,194	183,031	0.36 (0.00 to 2.16)	n/a	0.000% (0.000% to 0.001%)	n/a
Black-legged kittiwake	Pre-breeding (January to February)	691,526	107,878	8.74 (3.09 to 18.15)	3.09 (0.93 to 5.44)	0.008% (0.003% to 0.017%)	0.003% (0.001% to 0.005%)

Species	Season	Population	Baseline mortality	Mortality - Collisions when using species-group avoidance rates (LCI and UCI)	Mortality - Collisions when using species-specific avoidance rates (LCI and UCI)	Increase in baseline mortality (%) when using species-group avoidance rate (LCI and UCI)	Increase in baseline mortality (%) when using species-specific avoidance rate (LCI and UCI)
	Breeding (March to August)	156,679	24,442	15.52 (5.68 to 31.60)	4.66 (1.70 to 9.48)	0.063% (0.023% to 0.129%)	0.019% (0.007% to 0.039%)
	Post-breeding (September to December)	911,586	142,207	8.41 (2.96 to 17.53)	2.52 (0.89 to 5.26)	0.006% (0.002% to 0.012%)	0.002% (0.001% to 0.004%)
	Annual	911,586	142,207	32.67 (11.73 to 67.27)	9.80 (3.52 to 20.18)	0.023% (0.008% to 0.047%)	0.007% (0.002% to 0.014%)
Herring gull	Breeding (March to August)	31,214	5,338	0.03 (0.01 to 0.06)	0.02 (0.1 to 0.05)	0.001% (0.000% to 0.001%)	0.000% (0.002% to 0.001%)
	Non-breeding (September to February)	173,299	29,634	1.48 (0.50 to 3.13)	1.18 (0.40 to 2.51)	0.005% (0.002% to 0.011%)	0.004% (0.001% to 0.008%)
	Annual	173,299	29,634	1.51 (0.51 to 3.91)	1.20 (0.41 to 2.55)	0.005% (0.002% to 0.013%)	0.004% (0.001% to 0.009%)
Lesser black-backed gull	Pre-breeding (March)	163,304	19,760	0.83 (0.26 to 1.94)	0.64 (0.20 to 1.49)	0.004% (0.001% to 0.010%)	0.003% (0.001% to 0.008%)
	Breeding (April to August)	109,785	13,284	0.33 (0.10 to 0.81)	0.25 (0.08 to 0.62)	0.002% (0.001% to 0.006%)	0.002% (0.001% to 0.005%)
	Post-breeding (September to October)	163,304	19,760	No predicted collisions			
	Non-breeding (November to February)	41,159	4,980	0.76 (0.23 to 1.69)	0.58 (0.18 to 1.30)	0.015% (0.005% to 0.034%)	0.012% (0.004% to 0.026%)

Species	Season	Population	Baseline mortality	Mortality - Collisions when using species-group avoidance rates (LCI and UCI)	Mortality - Collisions when using species-specific avoidance rates (LCI and UCI)	Increase in baseline mortality (%) when using species-group avoidance rate (LCI and UCI)	Increase in baseline mortality (%) when using species-specific avoidance rate (LCI and UCI)
	Annual	163,304	19,760	1.92 (0.59 to 4.43)	1.47 (0.45 to 3.40)	0.010% (0.003% to 0.022%)	0.007% (0.002% to 0.017%)
Great black-backed gull	Breeding (March to August)	1,496	142	1.67 (0.59 to 3.48)	0.25 (0.09 to 0.52)	**1.176% (0.415% to 2.451%)**	0.176% (0.063% to 0.366%)
	Non-breeding (September to February)	17,742	1,685	3.16 (1.07 to 6.66)	0.47 (0.16 to 1.00)	0.188% (0.064% to 0.395%)	0.028% (0.009% to 0.059%)
	Annual	17,742	1,685	4.83 (1.66 to 10.13)	0.72 (0.25 to 1.52)	0.287% (0.099% to 0.601%)	0.043% (0.015% to 0.090%)
Manx shearwater	Pre-breeding (March)	1,580,895	205,516	No predicted collisions			
	Breeding (April to August)	1,821,544	236,800				
	Post-breeding (September to October)	1,580,895	205,516				
	Annual	2,372,485	308,423				

1.4.2 PVA for great black-backed gull from the Mona Offshore Wind Farm Project alone

1.4.2.1 When considering the mean and UCI of great black-backed gull collisions (Table 1.6), the increase in baseline mortality was >1% during the breeding season, and therefore, a PVA was undertaken (Table 1.7).

1.4.2.2 The PVA resulted in a predicted impact, which indicates that the median growth rate (and 95% confidence intervals) continues to be >1, and therefore, the population is predicted to increase in size under these modelled parameters for both impact scenarios (Table 1.7).

1.4.2.3 Given that the population is predicted to increase in size and the growth rate is not materially impacted when considering the mean and UCI collision estimates, there is no change to the magnitude of the impact on great black-backed gull during the breeding season. Therefore, the conclusions presented within Volume 2, Chapter 5: Offshore Ornithology (REP2-016) remain valid.

Table 1.7: PVA outputs for great black-backed gull during the breeding season.

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2022	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	4,119	175%	1.1347	1.1171	1.1526		
2030	Mean collisions	4,116	175%	1.1335	1.1155	1.1523	0.9990	0.9988
2030	UCI collisions	4,108	175%	1.1317	1.1141	1.1495	0.9976	0.9974
2065	Baseline	345,296	22,981%	1.1349	1.1339	1.1359		
2065	Mean collisions	330,737	22,008%	1.1335	1.1324	1.1346	0.9579	0.9988
2065	UCI collisions	315,022	20,958%	1.1320	1.1309	1.1331	0.9124	0.9974

1.5 Additional HRA information as requested by the SNCBs

1.5.1 Apportioned displacement impacts from the Mona Offshore Wind Project alone

1.5.1.1 For ease of calculating the apportioning impact, when using the SNCB-advised displacement and mortality rates, the following steps have been taken using common guillemot from Cape Wrath SPA during the non-breeding season as an example. This uses the information presented in section 1.3, which replicates previously submitted data that can be found in the relevant application documents (see section 1.3 for signposting to the relevant application documents).

1. Take the total impact from Table 1.3 which is 11 to 263 common guillemot from all age-classes.

2. Take the age-class apportioning percentage of adults from Table 1.4. During non-breeding, it is assumed that 100% of birds are adults due to difficulties in identifying age classes from DAS for common guillemot.
3. Take the apportioning value from Table 1.9 which is 7.92% of adult birds during the non-breeding season being from Cape Wrath SPA.
4. Multiply steps 1, 2 and 3 to calculate the apportioned impact on common guillemot from Cape Wrath SPA. 11*100*0.0792 = 0.9 and 263*100*0.0792 = 20.8
5. To calculate the increase in baseline mortality, take the colony size (from Table 1.9) and multiple by the average mortality rate (from Table 1.5) – 54,718*0.061 = 3,338. Then divide the predicted impact (0.9 to 20.8) by the baseline mortality 3,338 = 0.03 to 0.62%.

1.5.1.2 The bio-seasons included within the following tables replicate the tables presented in Appendix A of the HRA Stage 1 Screening (REP2-012). Therefore, some sites do not have non-breeding season impacts apportioned as they represent less than 1% of the relevant Biologically Defined Minimum Population Scales (BDMPS) and were screened out of assessment during those periods (in line with SNCB advice following the fifth EWG meeting (see Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)). However, within the in-combination tables (section 1.5.3) the complete annual impact is presented (including non-breeding impacts even when a site represents <1% of the BDMPS).

Atlantic puffin

1.5.1.3 When considering the full range of displacement impacts, the breeding season impact is 0 (0 to 1) birds and 0 (0 to 2) birds during the non-breeding season for all age-class birds (when considering the full range 30-70% displacement and 1-10% mortality). Apportioning one bird (the maximum impact during the breeding season) to the five SPAs considered in the HRA Stage 1 Screening (REP2-012) is not considered by the Applicant to be not proportionate to the potential risk posed to these SPAs as <1 bird per site would not equate to an AEoSI. Similarly, there were nine SPAs which represented more than >1% of the non-breeding BDMPS of Atlantic puffin. Apportioning two birds between nine SPAs again is not proportionate to the risk posed to these SPAs from the Mona Offshore Wind Project. Therefore, Atlantic puffin is not considered further in this document.

Black-legged kittiwake

1.5.1.4 As presented in Table 1.3, the breeding season impact for black-legged kittiwake was 4 (2 to 51), and the age-class apportioning was 95.36% of birds are adults (Table 1.4). During the spring migration season impact for black-legged kittiwake was 3 (2 to 40) birds and 3 (2 to 39) during the autumn migration season (Table 1.3). The age-class apportioning was 92.01% of birds are adults during both the spring and autumn migration seasons (Table 1.4). The baseline mortality for black-legged kittiwake is 0.146 (Table 1.5).

Table 1.8: Adult black-legged kittiwake mortality due to displacement apportioned to SPAs.

Site	Colony count (year)	Baseline Mortality (0.146)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]	Predicted impact (adult bird mortalities, 30% displacement and 3% mortality	Increase in baseline mortality (30% and 3%)
Lambay Island SPA	6,640 (2015)	969.4	Breeding	3.78	0.1 (0.1 to 1.8)	0.01% (0.01% to 0.19%)	0.4	0.04%
Rathlin Island SPA	27,534 (2021)	4,020.0	Breeding	4.91	0.2 (0.1 to 2.4)	0.00% (0.00% to 0.06%)	0.5	0.01%
			Post-breeding	1.91	0.1 (0.0 to 0.7)	0.00% (0.00% to 0.03%)	0.1	0.01%
			Pre-breeding	3.37	0.1 (0.1 to 1.2)	0.00% (0.00% to 0.05%)	0.3	0.01%

Site	Colony count (year)	Baseline Mortality (0.146)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]	Predicted impact (adult bird mortalities, 30% displacement and 3% mortality	Increase in baseline mortality (30% and 3%)
Ireland's Eye SPA	3,100 (2015)	452.6	Breeding	1.59	0.1 (0.0 to 0.8)	0.01% (0.01% to 0.17%)	0.2	0.04%
Howth Head Coast SPA	3,586 (2015)	523.6	Breeding	1.84	0.1 (0.0 to 0.9)	0.01% (0.01% to 0.17%)	0.2	0.04%
Wicklow Head SPA	1,348 (2022)	196.8	Breeding	0.56	0.0 (0.0 to 0.3)	0.01% (0.01% to 0.14%)	0.1	0.03%
Helvick Head to Ballyquin SPA	130 (2018)	19.0	Breeding	0.01	0.0 (0.0 to 0.0)	0.00% (0.00% to 0.03%)	0.0	0.01%
Saltee Islands SPA	1,690 (2013)	246.7	Breeding	0.22	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.04%)	0.0	0.01%
North Colonsay and Western Cliffs SPA	9,361 (2023)	1,366.7	Breeding	0.85	0.0 (0.0 to 0.4)	0.00% (0.00% to 0.03%)	0.1	0.01%
Ailsa Craig SPA	980 (2021)	143.1	Breeding	0.30	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.10%)	0.0	0.02%
			Post-breeding	0.12	0.0 (0.0 to 0.0)	0.00% (0.00% to 0.03%)	0.0	0.01%
			Pre-breeding	0.21	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.05%)	0.0	0.01%
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	2,014 (2022)	294.0	Breeding	0.30	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.05%)	0.0	0.01%
			Post-breeding	0.25	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.03%)	0.0	0.01%
			Pre-breeding	0.45	0.0 (0.0 to 0.2)	0.00% (0.00% to 0.05%)	0.0	0.01%
North Caithness Cliffs SPA	20,300 (2000)	2,964	Post-breeding	0.81	0.0 (0.0 to 0.3)	0.00% (0.00% to 0.01%)	0.1	0.00%
			Pre-breeding	1.62	0.1 (0.0 to 0.6)	0.00% (0.00% to 0.02%)	0.1	0.00%
East Caithness Cliffs SPA	80,820 (1999)	11,800	Post-breeding	3.24	0.1 (0.1 to 1.2)	0.00% (0.00% to 0.01%)	0.2	0.00%
			Pre-breeding	6.45	0.2 (0.1 to 2.4)	0.00% (0.00% to 0.02%)	0.5	0.00%

Site	Colony count (year)	Baseline Mortality (0.146)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]	Predicted impact (adult bird mortalities, 30% displacement and 3% mortality	Increase in baseline mortality (30% and 3%)
Troup, Pennan and Lions Heads SPA	29,792 (2007)	4,350	Post-breeding	1.19	0.0 (0.0 to 0.4)	0.00% (0.00% to 0.01%)	0.1	0.00%
			Pre-breeding	2.38	0.1 (0.0 to 0.9)	0.00% (0.00% to 0.02%)	0.2	0.00%
Buchan Ness to Collieston SPA	25,084 (2007)	3,662	Post-breeding	1.01	0.0 (0.0 to 0.4)	0.00% (0.00% to 0.01%)	0.1	0.00%
			Pre-breeding	2.00	0.1 (0.0 to 0.7)	0.00% (0.00% to 0.02%)	0.2	0.00%
Fowlsheugh SPA	18,674 (2012)	2,726	Post-breeding	0.75	0.0 (0.0 to 0.3)	0.00% (0.00% to 0.01%)	0.1	0.00%
			Pre-breeding	1.49	0.1 (0.0 to 0.5)	0.00% (0.00% to 0.02%)	0.1	0.00%
Flamborough and Filey Coast SPA	75,234 (2008)	10,984	Post-breeding	3.02	0.1 (0.1 to 1.1)	0.00% (0.00% to 0.01%)	0.2	0.00%
			Pre-breeding	6.01	0.2 (0.1 to 2.2)	0.00% (0.00% to 0.02%)	0.5	0.00%
Cape Wrath SPA	20,688 (2000)	3,020	Post-breeding	2.49	0.1 (0.0 to 0.9)	0.00% (0.00% to 0.03%)	0.2	0.01%
			Pre-breeding	4.40	0.1 (0.1 to 1.6)	0.00% (0.00% to 0.05%)	0.4	0.01%
North Colonsay and Western Cliffs SPA	11,126 (2000)	1,624	Post-breeding	1.34	0.0 (0.0 to 0.5)	0.00% (0.00% to 0.03%)	0.1	0.01%
			Pre-breeding	2.37	0.1 (0.0 to 0.9)	0.00% (0.00% to 0.05%)	0.2	0.01%
West Westray SPA	24,110 (2007)	3,520	Post-breeding	1.93	0.1 (0.0 to 0.7)	0.00% (0.00% to 0.02%)	0.1	0.00%

1 Values represent 50% displacement and 1% mortality (30% displacement and 1% mortality – 70% displacement and 10% mortality)

Common guillemot

1.5.1.5 As presented in Table 1.3, the non-breeding season impact for common guillemot was 19 (11 to 263) and the age-class apportioning is 100% of birds are considered adults (Table 1.4). The baseline mortality for common guillemot is 0.061 (Table 1.5).

1.5.1.6 Within Table 1.9, the displacement impact is also considered using a 70% displacement rate and a 2% mortality rate alongside the SNCBs advised range, which is in line with recent HRAs undertaken by the Secretary of State for offshore wind projects within the North Sea (e.g Hornsea Two/Three/Four, East Anglia One North, East Anglia Two, Norfolk Boreas, Norfolk Vanguard, SEP and DEP).

Table 1.9: Adult non-breeding common guillemot mortality due to displacement apportioned to SPAs.

SPA	Colony Count (year)	Baseline mortality (0.061)	Apportioning value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]	Predicted Impact (adult bird mortalities, 70% displacement, 2% mortality)	Increase in baseline mortality (70% displacement, 2% mortality)
Sule Skerry and Sule Stack SPA	15,266 (1998)	931	2.21	0.4 (0.2 to 5.8)	0.045% (0.03% to 0.62%)	1.17	0.13%
North Rona and Sula Sgeir SPA	10,000 (1998)	610	1.45	0.3 (0.2 to 3.8)	0.045% (0.03% to 0.62%)	0.77	0.13%
Cape Wrath SPA	54,718 (2000)	3,338	7.92	1.5 (0.9 to 20.8)	0.045% (0.03% to 0.62%)	4.20	0.13%
Handa SPA	75,986 (1998)	4,635	11.00	2.1 (1.2 to 28.9)	0.045% (0.03% to 0.62%)	5.83	0.13%
Shiant Isles SPA	10,296 (1999)	628	1.49	0.3 (0.2 to 3.9)	0.045% (0.03% to 0.62%)	0.79	0.13%
Flannan Isles SPA	19,614 (1998)	1,196	2.84	0.5 (0.3 to 7.5)	0.045% (0.03% to 0.62%)	1.51	0.13%
St Kilda SPA	31,400 (1999)	1,915	4.55	0.9 (0.5 to 12.0)	0.045% (0.03% to 0.62%)	2.41	0.13%
Canna and Sanday SPA	7,826 (1999)	477	1.13	0.2 (0.1 to 3.0)	0.045% (0.03% to 0.62%)	0.60	0.13%
Mingulay and Berneray SPA	27,054 (2003)	1,650	3.92	0.7 (0.4 to 10.3)	0.045% (0.03% to 0.62%)	2.08	0.13%
North Colonsay and Western Cliffs SPA	27,000 (2000)	1,647	4.11	0.8 (0.5 to 10.8)	0.047% (0.03% to 0.66%)	2.18	0.13%
Ailsa Craig SPA	10,494 (2013)	640	1.60	0.3 (0.2 to 4.2)	0.047% (0.03% to 0.66%)	0.85	0.13%

SPA	Colony Count (year)	Baseline mortality (0.061)	Apportioning value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]	Predicted Impact (adult bird mortalities, 70% displacement, 2% mortality)	Increase in baseline mortality (70% displacement, 2% mortality)
Rathlin Island SPA	174,796 (2011)	10,663	26.64	5.1 (2.9 to 70.1)	0.047% (0.03% to 0.66%)	14.12	0.13%
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	32,600 (2013)	1,989	4.47	0.8 (0.5 to 11.8)	0.043% (0.02% to 0.59%)	2.37	0.12%

1 Values represent 50% displacement and 1% mortality (30% displacement and 1% mortality – 70% displacement and 10% mortality)

Northern Gannet

1.5.1.7 As presented in Table 1.3, the breeding season impact for northern gannet was 2 (2 to 20), and the age-class apportioning was 93.58% of birds are adults (Table 1.4). During post-breeding season, the impact for northern gannet was 0 (0 to 2) birds and 0 (0 to 5) birds for the pre-breeding season (Table 1.3). The age-class apportioning was 96.43% of birds are adults during both the pre- and post-breeding seasons (Table 1.4). The baseline mortality for northern gannet is 0.081 (Table 1.5).

Table 1.10: Adult northern gannet mortality due to displacement apportioned to SPAs.

Site	Colony count (year)	Baseline Mortality (0.081)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities, 60 % displacement and 1% mortality to 80% displacement and 10% mortality)	Increase in baseline mortality (per bio season)
Ailsa Craig SPA	66,452 (2014)	5,382.6	Breeding	56.16	1.0 to 10.5	0.02% to 0.19%
			Post-breeding	17.06	0.0 to 0.8	0.00% to 0.02%
			Pre-breeding	13.86	0.0 to 0.3	0.00% to 0.01%
Grassholm SPA	72,022 (2015)	5,833.8	Breeding	17.61	0.3 to 3.3	0.01% to 0.06%
			Post-breeding migration	24.71	0.0 to 1.2	0.00% to 0.02%
			Pre-breeding	20.07	0.0 to 0.4	0.00% to 0.01%
Saltee Islands SPA	9,444 (2013)	765.0	Breeding	2.82	0.1 to 0.5	0.01% to 0.07%
Skelligs SPA	70,588 (2014)	5,717.6	Breeding	4.37	0.1 to 0.8	0.00% to 0.01%
St Kilda SPA	120,636 (2014)	9,771.5	Breeding	5.04	0.1 to 0.9	0.00% to 0.01%
			Post-breeding migration	33.75	0.0 to 1.6	0.00% to 0.02%
			Pre-breeding	30.46	0.0 to 0.6	0.00% to 0.01%
Hermaness, Saxa Vord and Valla Field SPA	48,706 (2008)	3,945	Post-breeding migration	3.06	0.0 to 0.1	0.00% to 0.00%
			Pre-breeding	3.73	0.0 to 0.1	0.00% to 0.00%
Noss SPA	19,534 (2008)	1,582	Post-breeding migration	1.23	0.0 to 0.1	0.00% to 0.00%
			Pre-breeding	1.50	0.0 to 0.0	0.00% to 0.00%
Sule Skerry and Sule Stack SPA	9,350 (2004)	757	Post-breeding migration	2.65	0.0 to 0.1	0.00% to 0.02%
			Pre-breeding	2.39	0.0 to 0.0	0.00% to 0.01%
		1,494	Post-breeding migration	5.22	0.0 to 0.3	0.00% to 0.02%

Site	Colony count (year)	Baseline Mortality (0.081)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities, 60 % displacement and 1% mortality to 80% displacement and 10% mortality)	Increase in baseline mortality (per bio season)
North Rona and Sula Sgeir SPA	18,450 (2004)		Pre-breeding	4.71	0.0 to 0.1	0.00% to 0.01%

Manx shearwater

1.5.1.8 As presented in Table 1.3, the breeding season impact for Manx shearwater was 6 (4 to 87), and the age-class apportioning was 100% of birds are adults (Table 1.4). During pre-breeding season, the impact for Manx shearwater was 0 (0 to 0) birds, and 0 (0 to 1) birds for the post-breeding season (Table 1.3). The age-class apportioning was 100% of birds are adults during both the pre- and post-breeding seasons (Table 1.4). The baseline mortality for Manx shearwater is 0.130 (Table 1.5).

Table 1.11. Adult Manx shearwater mortality due to displacement apportioned to SPAs.

Site	Colony count (year)	Baseline Mortality (0.130)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]
Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA	32,366 (2001)	4,207.6	Breeding	11.34	0.7 (0.5 to 9.9)	0.02% (0.01% to 0.23%)
			Post-breeding	3.26	0.0 (0.0 to 0.4)	0.0 (0.00% to 0.01%)
Copeland Islands SPA	9,700 (2007)	1,261.0	Breeding	2.20	0.1 (0.1 to 1.9)	0.01% (0.01% to 0.15%)
Cruagh Island SPA	6,572 (2001)	854.4	Breeding	0.17	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.02%)
Blasket Islands SPA	39,068 (2001)	5,078.8	Breeding	0.75	0.0 (0.0 to 0.7)	0.00% (0.00% to 0.01%)
Skelligs SPA	1,476 (2001)	191.9	Breeding	0.03	0.0 (0.0 to 0.0)	0.00% (0.00% to 0.01%)
Deenish Island and Scariff Island SPA	4,622 (2000)	600.9	Breeding	0.09	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.01%)
Rum SPA	240,000 (2001)	31,200.0	Breeding	7.01	0.4 (0.3 to 6.1)	0.00% (0.00% to 0.02%)
			Pre-breeding	24.19	0.0 (0.0 to 0.0)	0.00% (0.00% to 0.00%)
			Post-breeding	24.19	0.0 (0.2 to 3.1)	0.00% (0.00% to 0.01%)
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	910,312 (2018)	118,340.6	Breeding	74.975	4.5 (3.0 to 65.2)	0.00% (0.00% to 0.06%)
			Pre-breeding	70.54	0,0 (0.0 to 0.0)	0.00% (0.00% to 0.00%)
			Post-breeding	70.54	0.0 (0.7 to 9.2)	0.00% (0.00% to 0.01%)

Site	Colony count (year)	Baseline Mortality (0.130)	Bio season	Apportioning Value (%)	Predicted Impact (adult bird mortalities)[1]	Increase in baseline mortality[1]
St Kilda SPA	9,604 (1999)	1,249	Pre-breeding	0.97	0.0 (0.0 to 0.0)	0.00% (0.00% to 0.00%)
			Post-breeding	0.97	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.01%)

1 Values represent 50% displacement and 1% mortality (30% displacement and 1% mortality – 70% displacement and 10% mortality)

Razorbill

1.5.1.9 As presented in Table 1.3, the migration season impact for razorbill was 10 (6 to 141) and 2 (1 to 29) during the winter. The age-class apportioning is 100% of birds are considered adults (Table 1.4). The baseline mortality for razorbill is 0.105 (Table 1.5).

1.5.1.10 Within Table 1.12, the displacement impact is also considered using a 70% displacement rate and a 2% mortality rate alongside the SNCBs advised range, which is in line with recent HRAs undertaken by the Secretary of State for offshore wind projects within the North Sea (e.g Hornsea Three/Four, DEP and SEP).

Table 1.12: Adult non-breeding razorbill mortality due to displacement apportioned to SPAs.

SPA	Colony count (year)	Baseline Mortality (0.105)	Bio season	Predicted Impact (adult bird mortalities)[1]		Increase in baseline mortality[1]	Predicted Impact (no. mortalities, 70% displacementand 2% mortality)	Increase in baseline mortality (70% displacement and 2% mortality)
Cape Wrath SPA	4,180 (2000)	439	Migration seasons	0.1 (0.1 to 1.8)	0.03% (0.02% to 0.42%)	0.18	0.04%	
			Winter	0.0 (0.0 to 0.3)	0.00% (0.00% to 0.06%)	0.13	0.03%	
Handa SPA	10,330 (2010)	1,085	Migration seasons	0.3 (0.2 to 4.5)	0.03% (0.02% to 0.42%)	0.45	0.04%	
			Winter	0.0 (0.0 to 0.7)	0.00% (0.00% to 0.06%)	0.32	0.03%	
Shiant Isles SPA	8,496 (2008)	892	Migration seasons	0.3 (0.2 to 3.7)	0.03% (0.02% to 0.42%)	0.37	0.04%	
			Winter	0.0 (0.0 to 0.5)	0.00% (0.00% to 0.06%)	0.27	0.03%	
Mingulay and Berneray SPA	20,222 (2009)	2,123	Migration seasons	0.6 (0.4 to 8.8)	0.03% (0.02% to 0.42%)	0.88	0.04%	
			Winter	0.1 (0.0 to 1.3)	0.00% (0.00% to 0.06%)	0.63	0.03%	
Rathlin Island SPA	30,786 (2011)	3,233	Migration seasons	1.0 (0.6 to 13.4)	0.03% (0.02% to 0.42%)	1.33	0.04%	
			Winter	0.1 (0.1 to 2.0)	0.00% (0.00% to 0.06%)	0.96	0.03%	

SPA	Colony count (year)	Baseline Mortality (0.105)	Bio season	Predicted Impact (adult bird mortalities)[1]		Increase in baseline mortality[1]	Predicted Impact (no. mortalities, 70% displacementand 2% mortality)	Increase in baseline mortality (70% displacement and 2% mortality)
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	12,002 (2013)	1,260	Migration seasons	0.4 (0.2 to 5.2)	0.03% (0.02% to 0.42%)	0.52	0.04%	
			Winter	0.0 (0.0 to 0.6)	0.00% (0.00% to 0.05%)	0.28	0.02%	
Flannan Isles SPA	2,102 (1998)	221	Migration seasons	0.1 (0.0 to 0.9)	0.03% (0.02% to 0.42%)	0.09	0.04%	
			Winter	0.0 (0.0 to 0.1)	0.00% (0.00% to 0.06%)	0.09	0.03%	

1.5.2 Apportioned collision impacts from the Mona Offshore Wind Project alone

1.5.2.1 The bio-seasons included within following tables replicate the tables presented in Appendix A of the HRA Stage 1 Screening (REP2-012). Therefore, some sites do not have non-breeding season impacts apportioned as they represent less than 1% of the relevant BDMPS and were screened out of assessment during those periods (in line with SCNB advice during the EWG (see Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)). However, within the in-combination tables (section 1.5.3) the complete annual impact is presented (including non-breeding impacts even when a site is <1% of the BDMPS) to provide a complete annual of the impact.

Black-legged kittiwake

1.5.2.2 As presented in Table 1.6 the breeding season impact for black-legged kittiwake was 15.52 (5.68 to 31.60) when using the species-group avoidance rate and the age-class apportioning was 95.36% of birds are adults (Table 1.4). During the spring migration season impact for black-legged kittiwake was 8.74 (3.09 to 18.15) birds and 8.41 (2.96 to 17.53) during the autumn migration season (Table 1.6). The age-class apportioning was 92.01% of birds are adults during both the spring and autumn migration seasons (Table 1.4).

Table 1.13: Adult black-legged kittiwake apportioned expected SPA mortality due to collision using species-group avoidance rate.

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts	Increase in baseline mortality (%)
Lambay Island SPA	6,640 (2015)	969.4	Breeding	3.78	0.0 to 0.2	0.02% to 0.12%
Rathlin Island SPA	27,534 (2021)	4,020.0	Breeding	4.91	0.0 to 0.2	0.01% to 0.04%
			Post-breeding	1.91	0.1 to 0.3	0.00% to 0.01%
			Pre-breeding	3.37	0.1 to 0.6	0.00% to 0.02%
Ireland's Eye SPA	3,100 (2015)	452.6	Breeding	1.59	0.0 to 0.1	0.02% to 0.11%
Howth Head Coast SPA	3,586 (2015)	523.6	Breeding	1.84	0.1 to 0.6	0.02% to 0.11%
Wicklow Head SPA	1,348 (2022)	196.8	Breeding	0.56	0.0 to 0.0	0.02% to 0.09%
Helvick Head to Ballyquin SPA	130 (2018)	19.0	Breeding	0.01	0.0 to 0.0	0.00% to 0.02%
Saltee Islands SPA	1,690 (2013)	246.7	Breeding	0.22	0.0 to 0.0	0.00% to 0.03%
North Colonsay and Western Cliffs SPA	9,361 (2023)	1,366.7	Breeding	0.85	0.0 to 0.0	0.00% to 0.02%

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts	Increase in baseline mortality (%)
Ailsa Craig SPA	980 (2021)	143.1	Breeding	0.30	0.0 to 0.0	0.01% to 0.06%
			Post-breeding	0.12	0.0 to 0.0	0.00% to 0.01%
			Pre-breeding	0.21	0.0 (0.0 to 0.0)	0.00% to 0.02%
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	2,014 (2022)	294.0	Breeding	0.30	0.0 to 0.0	0.01% to 0.03%
			Post-breeding	0.25	0.0 to 0.0	0.00% to 0.01%
			Pre-breeding	0.45	0.0 to 0.1	0.00% to 0.02%
North Caithness Cliffs SPA	20,300 (2000)	2,964	Post-breeding	0.81	0.0 to 0.1	0.00% to 0.00%
			Pre-breeding	1.62	0.0 to 0.3	0.00% to 0.01%
East Caithness Cliffs SPA	80,820 (1999)	11,800	Post-breeding	3.24	0.1 to 0.5	0.00% to 0.00%
			Pre-breeding	6.45	0.2 to 1.1	0.00% to 0.01%
Troup, Pennan and Lions Heads SPA	29,792 (2007)	4,350	Post-breeding	1.19	0.0 to 0.2	0.00% to 0.00%
			Pre-breeding	2.38	0.1 to 0.4	0.00% to 0.01%
Buchan Ness to Collieston SPA	25,084 (2007)	3,662	Post-breeding	1.01	0.0 to 0.2	0.00% to 0.00%
			Pre-breeding	2.00	0.1 to 0.3	0.00% to 0.01%
Fowlsheugh SPA	18,674 (2012)	2,726	Post-breeding	0.75	0.0 to 0.1	0.00% to 0.00%
			Pre-breeding	1.49	0.0 to 0.2	0.00% to 0.01%
Flamborough and Filey Coast SPA	75,234 (2008)	10,984	Post-breeding	3.02	0.1 to 0.5	0.00% to 0.00%
			Pre-breeding	6.01	0.2 to 1.0	0.00% to 0.01%
Cape Wrath SPA	20,688 (2000)	3,020	Post-breeding	2.49	0.1 to 0.4	0.00% to 0.01%
			Pre-breeding	4.40	0.1 to 0.7	0.00% to 0.02%
North Colonsay and Western Cliffs SPA	11,126 (2000)	1,624	Post-breeding	1.34	0.0 to 0.2	0.00% to 0.01%
			Pre-breeding	2.37	0.1 to 0.4	0.00% to 0.02%
West Westray SPA	24,110 (2007)	3,520	Post-breeding	1.93	0.1 to 0.3	0.00% to 0.01%

Herring gull

1.5.2.3 As presented in the breeding season impact for herring gull was 0.03 (0.01 to 0.06) and the age-class apportioning was 80.0% of birds are adults (Table 1.4). During the non-breeding season impact on herring gull was 1.48 (0.50 to 3.13) birds (Table 1.6) and the age-class apportioning was 75.61% of birds are adults (Table 1.4).

1.5.2.4 Species-group and species-specific avoidance rates are presented in Table 1.14.

Table 1.14: Adult herring gull apportioned expected SPA mortality due to collision.

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts using species-group avoidance (0.9939)	Increase in baseline mortality (%) using species-group avoidance (0.9939)	LCI and UCI of collision impacts using species-specific avoidance rates (0.9952)	Increase in baseline mortality (%) using species-specific avoidance rates (0.9952)
Morecambe Bay SPA	3,188 (2023)	529.2	Breeding	18.80%	0.0 to 0.0	0.00% to 0.00%	0.0 to 0.0	0.00% to 0.00%
			Non-breeding	3.18%	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.0	0.00% to 0.01%

Great black-backed gull

1.5.2.5 As presented in section 1.4.1, the non-breeding season impact for great black-backed gull was 3.16 (1.07 to 6.66) and the age-class apportioning was 70.49% of birds are adults (Table 1.4).

1.5.2.6 Species-group and species-specific avoidance rates are presented in Table 1.15

1.5.2.7 The predicted impact from the project alone is predicted to increase the baseline mortality by >1% when considering the UCI of collision impacts. No project alone PVA was undertaken because the predicted number of collision is very small (1.4 birds) when considering the UCI. Furthermore, the increase in baseline mortality is only marginally above the 1.00% threshold and the Applicant used expert judgement to determine whether PVA was required. The Applicant has presented a PVA for the in-combination impact on great black-backed gull from the Isles of Scilly SPA (section 1.6.5). The in-combination PVA predicts that with or without the impact the population of the Isles of Scilly SPA is expected to continue to grow.

Table 1.15. Adult great black-backed gull apportioned expected SPA mortality due to collision.

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts using species-group avoidance rates (0.9939)	Increase in baseline mortality (%) using species-group avoidance rates (0.9939)	LCI and UCI of collision impacts using species-specific avoidance rates (0.9991)	Increase in baseline mortality (%) using species-specific avoidance rates (0.9991)
Isles of Scilly SPA	1,802 (2006)	126.0	Non-breeding	28.85	0.2 to 1.4	0.18% to 1.08%	0.0 to 0.02	0.03% to 0.16%

Lesser black-backed gull

1.5.2.8 As presented in Table 1.6, the breeding season impact for lesser black-backed gull was 0.33 (0.10 to 0.81), and the age-class apportioning was 81.82% of birds are adults (Table 1.4). During the pre-breeding season impact for lesser black-backed gull was 0.83 (0.26 to 1.94) birds, and 0.76 (0.23 to 1.69) during the winter season (Table 1.4). The age-class apportioning was 86.96% of birds are adults during both the spring migration and winter seasons (Table 1.4).

1.5.2.9 Species-group and species-specific avoidance rates are presented in Table 1-16.

Table 1.16. Adult lesser black-backed gull apportioned expected SPA mortality due to collision.

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts using species-group avoidance rates (0.9939)	Increase in baseline mortality (%) using species-group avoidance rates (0.9939)	LCI and UCI of collision impacts using species-specific avoidance rates (0.9954)	Increase in baseline mortality (%) using species-specific avoidance rates (0.9954)
Ribble and Alt Estuaries SPA	8,978 (2021)	1,032.5	Breeding	26.78	0.0 to 0.2	0.00% to 0.02%	0.0 to 0.1	0.00% to 0.01%
			Post-breeding	7.30	No predicted collisions			
			Winter	9.18	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.01%
			Pre-breeding	7.47	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.00%
Morecambe Bay and Duddon Estuary SPA	4,874 (2023)	560.5	Breeding	12.72	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.01%
			Post-breeding	4.41	No predicted collisions			
			Winter	5.54	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.01%
			Pre-breeding	4.50	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.00%
Bowland Fells	29,254 (2012)	3,364.2	Breeding	37.21	0.0 to 0.2	0.00% to 0.01%	0.0 to 0.2	0.00% to 0.01%
			Post-breeding	4.04	No predicted collisions			
			Winter	5.08	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.01%
			Pre-breeding	4.13	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.00%

Site	Colony count	Baseline Mortality	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts using species-group avoidance rates (0.9939)	Increase in baseline mortality (%) using species-group avoidance rates (0.9939)	LCI and UCI of collision impacts using species-specific avoidance rates (0.9954)	Increase in baseline mortality (%) using species-specific avoidance rates (0.9954)
Lambay Island SPA	952 (2010)	109.5	Breeding	0.49	0.0 to 0.0	0.00% to 0.00%	0.0 to 0.0	0.00% to 0.00%
Ailsa Craig SPA	378 (2019)	43.5	Breeding	0.10	0.0 to 0.0	0.00% to 0.00%	0.0 to 0.0	0.00% to 0.00%
Rathlin Island SPA	1,038 (2021)	119.4	Breeding	0.16	0.0 to 0.0	0.00% to 0.00%	0.0 to 0.0	0.00% to 0.00%
			Post-breeding	0.09	No predicted collisions			
			Winter	0.12	0.0 to 0.0	0.00% to 0.01%	0.0 to 0.0	0.00% to 0.01%
			Pre-breeding	0.10	0.0 to 0.0	0.00% to 0.01%	0.0 to 0.0	0.00% to 0.00%
Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	16,214 (2023)	1,864.6	Breeding	1.95	0.0 to 0.0	0.00% to 0.00%	0.0 to 0.0	0.00% to 0.00%
			Post-breeding	11.92	No predicted collisions			
			Winter	10.70	0.0 to 0.2	0.00% to 0.01%	0.0 to 0.1	0.00% to 0.01%
			Pre-breeding	12.19	0.0 to 0.2	0.00% to 0.01%	0.0 to 0.2	0.00% to 0.01%
Isles of Scilly SPA	6,800 (2006)	782	Post-breeding	5.41	No predicted collisions			
			Winter	3.77	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.0	0.00% to 0.01%
			Pre-breeding	5.53	0.0 to 0.1	0.00% to 0.01%	0.0 to 0.0	0.00% to 0.01%

Manx shearwater

1.5.2.10 There were no predicted collisions for Manx shearwater throughout the entire year and so no apportioning table is presented.

Northern fulmar

1.5.2.11 Within Table 1.6, the impact on northern fulmar was 0.32 (0.00 to 1.94) birds (when considering the LCI and UCI of the collision impacts) during the breeding season. It is not deemed necessary to undertake a full apportioning for this species for the 10 SPAs identified within the HRA Stage 1 Screening Report (REP2-01). Northern fulmar has an extensive foraging range, and therefore, a large number of SPAs could be included.

1.5.2.12 Using the apportioning values from Morgan Offshore Wind Farm as a proxy (Morgan Generation Assets, 2024), the St Kilda SPA represented the largest apportioned value during the breeding season (1.0%). The latest population of St Kilda SPA is 58,372 adult birds, and the baseline mortality is 3,736 (using a baseline mortality of 0.064, Horswill and Robinson, 2014). Therefore, the added mortality of up to 0.02 birds (1.94 multiplied by 1.0%) represents a 0.005% increase in baseline mortality. Given the minute numbers involved, a full apportioning is not considered by the Applicant to be proportionate to the potential risk.

Northern gannet

1.5.2.13 As presented in Table 1.6, the breeding season impact for northern gannet was 1.42 (0.28 to 3.94), and the age-class apportioning was 93.58% of birds are adults (Table 1.4). During post-breeding migration season, the impact for northern gannet was 0.15 (0.03 to 0.39) birds and 0.13 (0.04 to 0.33) birds for the return migration season (Table 1.6). The age-class apportioning was 96.43% of birds are adults during both the post-breeding and return migration seasons (Table 1.4). The baseline mortality for northern gannet is 0.081 (Table 1.5).

1.5.2.14 Only species-group avoidance rate is presented in Table 1-17 as using the species-group avoidance rates are advised by the SNCBs.

Table 1.17: Adult northern gannet apportioned expected SPA mortality due to collision using species-group avoidance rate.

Site	Colony count (year)	Baseline Mortality (0.081)	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts	Increase in baseline mortality (%)
Ailsa Craig SPA	66,452 (2014)	5,383	Breeding	56.16	0.1 to 2.1	0.00% to 0.04%
			Post-breeding migration	17.06	0.1 to 0.1	0.00% to 0.00%
			Pre-breeding migration	13.86	0.0 to 0.1	0.00% to 0.00%
Grassholm SPA	72,022 (2015)	5,834	Breeding	17.61	0.0 to 0.6	0.00% to 0.01%
			Post-breeding migration	24.71	0.1 to 0.1	0.00% to 0.00%

Site	Colony count (year)	Baseline Mortality (0.081)	Bio season	Apportioning Value (%)	LCI and UCI of collision impacts	Increase in baseline mortality (%)
			Pre-breeding migration	20.07	0.0 to 0.1	0.00% to 0.00%
Saltee Islands SPA	9,444 (2013)	765	Breeding	2.82	0.0 to 0.1	0.00% to 0.01%
Skelligs SPA	70,588 (2014)	5,718	Breeding	4.37	0.0 to 0.2	0.00% to 0.00%
St Kilda SPA	120,636 (2014)	9,772	Breeding	5.04	0.0 to 0.2	0.00% to 0.00%
			Post-breeding migration	33.75	0.1 to 0.1	0.00% to 0.00%
			Pre-breeding migration	30.46	0.1 to 0.1	0.00% to 0.00%
Hermaness, Saxa Vord and Valla Field SPA	48,706 (2008)	3,945	Post-breeding migration	3.06	0.0 to 0.0	0.00% to 0.00%
			Pre-breeding migration	3.73	0.0 to 0.0	0.00% to 0.00%
Noss SPA	19,534 (2008)	1,582	Post-breeding migration	1.23	0.0 to 0.0	0.00% to 0.00%
			Pre-breeding migration	1.50	0.0 to 0.0	0.00% to 0.00%
Sule Skerry and Sule Stack SPA	9,350 (2004)	757	Post-breeding migration	2.65	0.0 to 0.0	0.00% to 0.00%
			Pre-breeding migration	2.39	0.0 to 0.0	0.00% to 0.00%
North Rona and Sula Sgeir SPA	18,450 (2004)	1,494	Post-breeding migration	5.22	0.0 to 0.0	0.00% to 0.00%
			Pre-breeding migration	4.71	0.0 to 0.0	0.00% to 0.00%

1.5.3 In-combination assessments

1.5.3.1 As requested by the SNCB's and following the Applicant's criteria (see Figure 1.1 of HRA Stage 2 Information to Support an Appropriate Assessment. Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-10) for inclusion of a SPA and qualifying feature to be taken through to in-combination assessment the following sites are considered below. The approach to the screening out of in-combination assessments was deemed appropriate by NRW as part of their Relevant Representation for the Mona Offshore Wind Project (see row RR-011.20 in Applicant's Response to Relevant Representations from Natural Resources Wales (NRW) PDA-011). The threshold for inclusion within an in-combination assessment was if the Mona Offshore Wind Project alone impacted the designated site by a >0.05% increase in baseline mortality. An increase of <0.05% was considered non-material and within natural fluctuations of the population. The following species and SPAs require an in-combination assessment when considering the SNCBs advised range of impacts:

- Black-legged kittiwake annually from:
  - Ailsa Craig SPA
  - Rathlin Island SPA
  - Lambay Island SPA
  - Ireland's Eye SPA
  - Howth Head Coast SPA
  - Wicklow Head SPA
  - Cape Wrath SPA
  - North Colonsay and Western Cliffs SPA
  - Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA
- Common guillemot during the non-breeding season from:
  - Sule Skerry and Sule Stack SPA
  - North Rona and Sula Sgeir SPA
  - Cape Wrath SPA
  - Handa SPA
  - Shiant Isles SPA
  - Flannan Isles SPA
  - St Kilda SPA
  - Canna and Sanday SPA
  - Mingulay and Berneray SPA
  - North Colonsay and western cliffs SPA
  - Ailsa Craig SPA
  - Rathlin Island SPA
  - Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA
- Great black-backed gull annually from the Isles of Scilly SPA

- Northern gannet annually from:
  - Ailsa Craig SPA
  - Grassholm SPA
  - Saltee Islands SPA
  - St Kilda SPA
- Manx shearwater annual from:
  - Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA
  - Copeland Islands SPA
  - Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA
- Razorbill during the non-breeding season from:
  - Cape Wrath SPA
  - Handa SPA
  - Shiant Isles SPA
  - Mingulay and Berneray SPA
  - Rathlin Island SPA
  - Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA
  - Flannan Isles SPA

Black-legged kittiwake

Ailsa Craig SPA

1.5.3.2 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Alisa Craig SPA, an in-combination assessment is presented within Table 1-18 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-19 (30% displacement and 3% mortality).

Table 1.18: In-combination assessment for black-legged kittiwake from the Ailsa Craig SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0021	0.001	0.0012	0.00 to 0.02	0.00 to 0.00	0.00 to 0.00	0.02	0.01	0.01	0.02 to 0.04	0.01 to 0.01	0.01 to 0.01
Burbo Bank Extension Offshore Wind Farm	0.0021	0.003	0.0012	0.00 to 0.00	0.00 to 0.08	0.00 to 0.00	0.00	0.04	0.00	0.00 to 0.00	0.04 to 0.12	0.00 to 0.00
Erebus Floating Wind Demo	0.0021	No connectivity	0.0012	0.00 to 0.00	-	0.00 to 0.02	0.01	-	0.02	0.01 to 0.01		0.02 to 0.04
TwinHub (Wave Hub Floating Wind Farm)	0.0021	No connectivity	0.0012	0.00 to 0.00	-	0.00 to 0.01	0.00	-	0.00	0.00 to 0.00		0.00 to 0.01
Mona Offshore Wind Project	0.0021	0.001	0.0012	0.00 to 0.04	0.00 to 0.03	0.00 to 0.03	0.02	0.00	0.01	0.02 to 0.06	0.01 to 0.03	0.01 to 0.03

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Morecambe Offshore Windfarm Generation Assets	0.0021	0.003	0.0012	0.00 to 0.09	0.02 to 0.44	0.01 to 0.18	0.01	0.02	0.01	0.01 to 0.10	0.04 to 0.46	0.02 to 0.19
Morgan Offshore Wind Project Generation Assets	0.0021	0.002	0.0012	0.00 to 0.05	0.00 to 0.03	0.00 to 0.07	0.01	0.01	0.01	0.02 to 0.07	0.01 to 0.04	0.02 to 0.09
Ormonde Wind Farm	0.0021	0.003	0.0012	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.01	0.00	0.00 to 0.00	0.01 to 0.01	0.00 to 0.00
Rampion Offshore Wind Farm	0.0021	No connectivity	0.0012	0.00 to 0.06	-	0.00 to 0.01	0.05	-	0.01	0.05 to 0.11	-	0.01 to 0.02
Rampion 2 Offshore Wind Farm	0.0021	No connectivity	0.0012	0.00 to 0.02	-	0.00 to 0.00	0.02	-	0.01	0.02 to 0.04	-	0.01 to 0.01
Walney (3 and 4) Extension Offshore Wind Farm	0.0021	0.003	0.0012	0.00 to 0.11	0.00 to 0.04	0.00 to 0.05	0.02	0.03	0.06	0.02 to 0.13	0.03 to 0.07	0.06 to 0.10
West of Orkney Windfarm	0.0021	No connectivity	0.0012	0.00 to 0.10	-	0.00 to 0.04	0.02	-	0.01	0.03 to 0.12	-	0.01 to 0.05
White Cross Offshore Windfarm	0.0021	No connectivity	0.0012	0.00 to 0.05	-	0.00 to 0.01	0.01	-	0.00	0.01 to 0.06	-	0.00 to 0.01

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Total predicted impact (adult birds)				**0.02 to 0.57**	**0.03 to 0.61**	**0.02 to 0.42**	**0.18**	**0.11**	**0.13**	**0.21 to 0.75**	**0.14 to 0.73**	**0.15 to 0.55**
Increase in baseline mortality (%)				**0.02% to 0.40%**	**0.02% to 0.43%**	**0.01% to 0.29%**	**0.13%**	**0.08%**	**0.09%**	**0.15% to 0.52%**	**0.10 to 0.51%**	**0.10 to 0.39%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**0.50 to 2.03 birds** **0.35% to 1.42% increase in baseline mortality**		

1.5.3.3 As previously discussed (section 1.1.2), the Applicant is not proposing to undertake PVA on 70% displacement and 10% mortality as previously advised by the JNCC due to a lack of empirical evidence for this displacement and mortality rate scenario (see paragraph 1.2.1.8 for further justification). However, in accordance with NatureScot's guidance (NatureScot, 2023), the Applicant has presented 30% displacement and 3% mortality within Table 1-19.

Table 1.19: In-combination assessment for black-legged kittiwake from the Ailsa Craig SPA – when considering 30% and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0021	0.001	0.0012	0.00	0.00	0.00	0.02	0.01	0.01	0.02	0.01	0.01
Burbo Bank Extension Offshore Wind Farm	0.0021	0.003	0.0012	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.05	0.00

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Erebus Floating Wind Demo	0.0021	No connectivity	0.0012	0.00		0.00	0.01	-	0.02	0.01	-	0.02
TwinHub (Wave Hub Floating Wind Farm)	0.0021	No connectivity	0.0012	0.00		0.00	0.00	-	0.00	0.00	-	0.00
Mona Offshore Wind Project	0.0021	0.001	0.0012	0.01	0.00	0.00	0.02	0.00	0.01	0.02	0.01	0.01
Morecambe Offshore Windfarm Generation Assets	0.0021	0.003	0.0012	0.01	0.06	0.02	0.01	0.02	0.01	0.02	0.08	0.03
Morgan Offshore Wind Project Generation Assets	0.0021	0.002	0.0012	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.02
Ormonde Wind Farm	0.0021	0.003	0.0012	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
Rampion Offshore Wind Farm	0.0021	No connectivity	0.0012	0.01	-	0.00	0.05	-	0.01	0.06	-	0.01
Rampion 2 Offshore Wind Farm	0.0021	No connectivity	0.0012	0.00	-	0.00	0.02	-	0.01	0.02	-	0.01

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Walney (3 and 4) Extension Offshore Wind Farm	0.0021	0.003	0.0012	0.01	0.00	0.01	0.02	0.03	0.06	0.03	0.03	0.06
West of Orkney Windfarm	0.0021	No connectivity	0.0012	0.01	-	0.00	0.02	-	0.01	0.04	-	0.02
White Cross Offshore Windfarm	0.0021	No connectivity	0.0012	0.01	-	0.00	0.01	-	0.00	0.02	-	0.00
Total predicted impact (adult birds)				**0.07**	**0.08**	**0.05**	**0.18**	**0.11**	**0.13**	**0.26**	**0.19**	**0.19**
Increase in baseline mortality (%)				**0.05%**	**0.06%**	**0.04%**	**0.13%**	**0.08%**	**0.09%**	**0.18%**	**0.13%**	**0.13%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**0.63 birds** **0.44% increase in baseline mortality**		

1.5.3.4 As the predicted impact on black-legged kittiwake from Ailsa Craig SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Rathlin Island SPA

1.5.3.5 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Rathlin Island SPA, an in-combination assessment is presented within Table 1-20 (70% displacement and 10% mortality) and Table 1-21 (30% displacement and 3% mortality).

Table 1.20: In-combination assessment for black-legged kittiwake from the Rathlin Island SPA – when considering 30-70% displacement and 1-10% mortality).

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0337	No connectivity	0.0191	0.02 to 0.37		0.00 to 0.06	0.27	-	0.08	0.29 to 0.65		0.09 to 0.14
Burbo Bank Extension Offshore Wind Farm	0.0337	0.063	0.0191	0.00 to 0.00	0.07 to 1.66	0.00 to 0.00	0.00	0.77	0.00	0.00 to 0.00	0.84 to 2.43	0.00 to 0.00
Erebus Floating Wind Demo	0.0337	No connectivity	0.0191	0.00 to 0.00		0.02 to 0.36	0.22	-	0.25	0.22 to 0.23		0.27 to 0.61
TwinHub (Wave Hub Floating Wind Farm)	0.0337	No connectivity	0.0191	0.00 to 0.07		0.01 to 0.13	0.00	-	0.00	0.00 to 0.07		0.01 to 0.13
Mona Offshore Wind Project	0.0337	0.02	0.0191	0.03 to 0.72	0.02 to 0.54	0.02 to 0.40	0.27	0.10	0.09	0.30 to 0.99	0.12 to 0.64	0.10 to 0.48
Morecambe Offshore Windfarm Generation Assets	0.0337	0.063	0.0191	0.06 to 1.46	0.39 to 9.15	0.12 to 2.88	0.10	0.50	0.12	0.16 to 1.55	0.90 to 9.65	0.24 to 3.00
Morgan Offshore Wind Project Generation Assets	0.0337	0.04	0.0191	0.03 to 0.81	0.03 to 0.69	0.05 to 1.15	0.24	0.11	0.22	0.27 to 1.05	0.14 to 0.79	0.27 to 1.37
Ormonde Wind Farm	0.0337	0.063	0.0191	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.11	0.00	0.00 to 0.00	0.11 to 0.11	0.00 to 0.00

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion Offshore Wind Farm	0.0337	No connectivity	0.0191	0.04 to 1.04		0.01 to 0.16	0.75	-	0.16	0.79 to 1.79		0.17 to 0.32
Rampion 2 Offshore Wind Farm	0.0337	No connectivity	0.0191	0.02 to 0.36		0.00 to 0.07	0.30	-	0.10	0.32 to 0.66		0.10 to 0.17
Walney (3 and 4) Extension Offshore Wind Farm	0.0337	0.063	0.0191	0.08 to 1.84	0.03 to 0.75	0.03 to 0.79	0.27	0.63	0.88	0.35 to 2.11	0.66 to 1.38	0.91 to 1.67
West of Orkney Windfarm	0.0337	No connectivity	0.0191	0.07 to 1.53		0.02 to 0.57	0.38	-	0.17	0.44 to 1.90		0.19 to 0.74
White Cross Offshore Windfarm	0.0337	No connectivity	0.0191	0.04 to 0.88		0.01 to 0.12	0.17	-	0.02	0.20 to 1.04		0.02 to 0.14
Total predicted impact (adult birds)				**0.39 to 9.08**	**0.55 to 12.78**	**0.29 to 6.69**	**2.97**	**2.22**	**2.08**	3.36 to 12.05	2.77 to 15.00	2.37 to 8.78
Increase in baseline mortality (%)				**0.01% to 0.23%**	**0.01% to 0.32%**	**0.01% to 0.17%**	**0.07%**	**0.06%**	**0.05%**	0.08% to 0.30%	0.07% to 0.37%	0.06% to 0.22%
Annual impact and increase in baseline mortality from the combined impact (when considering 30%displacement and 1% mortality to 70% displacement and 10% mortality)										**8.50 to 35.82 birds** **0.21% to 0.89% increase in baseline mortality**		

1.5.3.6 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-21.

Table 1.21: In-combination assessment for black-legged kittiwake from the Rathlin Island SPA – when considering 30% displacement and 3% mortality).

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0337	No connectivity	0.0191	0.05		0.01	0.27	-	0.08	0.32	-	0.09
Burbo Bank Extension Offshore Wind Farm	0.0337	0.063	0.0191	0.00	0.21	0.00	0.00	0.77	0.00	0.00	0.99	0.00
Erebus Floating Wind Demo	0.0337	No connectivity	0.0191	0.00		0.05	0.22	-	0.25	0.22	-	0.30
TwinHub (Wave Hub Floating Wind Farm)	0.0337	No connectivity	0.0191	0.01		0.02	0.00	-	0.00	0.01	-	0.02
Mona Offshore Wind Project	0.0337	0.02	0.0191	0.09	0.07	0.05	0.27	0.10	0.09	0.36	0.17	0.14
Morecambe Offshore Windfarm Generation Assets	0.0337	0.063	0.0191	0.19	1.18	0.37	0.10	0.50	0.12	0.28	1.68	0.49
Morgan Offshore Wind Project Generation Assets	0.0337	0.04	0.0191	0.10	0.09	0.15	0.24	0.11	0.22	0.34	0.19	0.37
Ormonde Wind Farm	0.0337	0.063	0.0191	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.11	0.00
Rampion Offshore Wind Farm	0.0337	No connectivity	0.0191	0.13		0.02	0.75	-	0.16	0.88	-	0.18
Rampion 2 Offshore Wind Farm	0.0337	No connectivity	0.0191	0.05		0.01	0.30	-	0.10	0.35	-	0.11

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Walney (3 and 4) Extension Offshore Wind Farm	0.0337	0.063	0.0191	0.24	0.10	0.10	0.27	0.63	0.88	0.51	0.73	0.98
West of Orkney Windfarm	0.0337	No connectivity	0.0191	0.20		0.07	0.38	-	0.17	0.57	-	0.24
White Cross Offshore Windfarm	0.0337	No connectivity	0.0191	0.11		0.02	0.17	-	0.02	0.28	-	0.03
Total predicted impact (adult birds)				**1.17**	**1.64**	**0.86**	**2.97**	**2.22**	**2.08**	**4.13**	**3.86**	**2.94**
Increase in baseline mortality (%)				**0.03%**	**0.04%**	**0.02%**	**0.07%**	**0.06%**	**0.05%**	**0.10%**	**0.10%**	**0.07%**
Annual impact and increase in baseline mortality from the combined impact (when considering 70% displacement and 10% mortality)										**10.94 birds 0.27% increase in baseline mortality**		

1.5.3.7 As the predicted impact on black-legged kittiwake from Rathlin Island SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site, therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects..

Lambay Island SPA

1.5.3.8 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Lambay Island SPA, an in-combination assessment is presented within Table 1-22 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-23 (30% displacement and 3% mortality).

Table 1.22: In-combination assessment for black-legged kittiwake from the Lambay Island SPA– when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30%displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.006	0.022	0.004	0.00 to 0.07	0.00 to 0.07	0.00 to 0.01	0.05	0.14	0.02	0.06 to 0.13	0.14 to 0.21	0.02 to 0.04
Burbo Bank Extension Offshore Wind Farm	0.006	0.023	0.004		0.03 to 0.61		0.00	0.28	0.00	0.00 to 0.00	0.31 to 0.90	0.00 to 0.00
Erebus Floating Wind Demo	0.006	0.031	0.004	0.00 to 0.00	0.10 to 2.33	0.00 to 0.09	0.04	0.01	0.06	0.04 to 0.04	0.11 to 2.34	0.07 to 0.16
TwinHub (Wave Hub Floating Wind Farm)	0.006	0.031	0.004	0.00 to 0.01	0.00 to 0.00	0.00 to 0.03	0.00	0.16	0.00	0.00 to 0.01	0.16 to 0.17	0.00 to 0.03
Mona Offshore Wind Project	0.006	0.038	0.004	0.01 to 0.14	0.04 to 1.03	0.00 to 0.10	0.04	0.19	0.02	0.06 to 0.19	0.23 to 1.22	0.03 to 0.12
Morecambe Offshore Windfarm Generation Assets	0.006	0.023	0.004	0.01 to 0.28	0.14 to 3.37	0.03 to 0.74	0.02	0.19	0.03	0.03 to 0.30	0.33 to 3.55	0.06 to 0.77
Morgan Offshore Wind Project Generation Assets	0.006	0.033	0.004	0.01 to 0.16	0.02 to 0.57	0.01 to 0.30	0.04	0.09	0.05	0.05 to 0.20	0.11 to 0.65	0.07 to 0.35
Ormonde Wind Farm	0.0021	0.0232	0.0012	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.04	0.00	0.00 to 0.00	0.04 to 0.04	0.00 to 0.00
Rampion Offshore Wind Farm	0.006	No connectivity	0.004	0.01 to 0.20		0.00 to 0.04	0.12	-	0.04	0.15 to 0.35		0.04 to 0.08

Plan or project	Apportioning values			Apportioned displacement impact values (30%displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion 2 Offshore Wind Farm	0.006	No connectivity	0.004	0.00 to 0.07		0.00 to 0.02	0.05	-	0.02	0.06 to 0.13		0.03 to 0.04
Walney (3 and 4) Extension Offshore Wind Farm	0.006	0.023	0.004	0.02 to 0.36	0.01 to 0.28	0.01 to 0.20	0.05	0.23	0.20	0.07 to 0.41	0.24 to 0.51	0.23 to 0.43
West of Orkney Windfarm	0.006	No connectivity	0.004	0.01 to 0.29		0.01 to 0.15	0.06	-	0.04	0.09 to 0.37		0.05 to 0.19
White Cross Offshore Windfarm	0.006	0.031	0.004	0.01 to 0.17	0.00 to 0.05	0.00 to 0.03	0.03	0.06	0.00	0.04 to 0.20	0.06 to 0.11	0.01 to 0.04
Total predicted impact (adult birds)				0.08 to 1.75	0.36 to 8.31	0.07 to 1.72	**0.57**	**1.39**	**0.53**	0.65 to 2.32	1.74 to 9.70	0.61 to 2.25
Increase in baseline mortality (%)				0.01% to 0.18%	0.04% to 0.86%	0.01% to 0.18%	**0.06%**	**0.14%**	**0.06%**	0.07% to 0.24%	0.18% to 1.00%	0.06% to 0.23%
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**3.00 to 14.27 birds** **0.31% to 1.47 % increase in baseline mortality**		

1.5.3.9 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-23.

Table 1.23: In-combination assessment for black-legged kittiwake from the Lambay Island SPA– when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.01	0.01	0.00	0.05	0.14	0.02	0.06	0.15	0.02	0.01	0.01	0.00
Burbo Bank Extension Offshore Wind Farm		0.08		0.00	0.28	0.00	0.00	0.36	0.00		0.08	
Erebus Floating Wind Demo	0.00	0.30	0.01	0.04	0.01	0.06	0.04	0.31	0.08	0.00	0.30	0.01
TwinHub (Wave Hub Floating Wind Farm)	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.16	0.00	0.00	0.00	0.00
Mona Offshore Wind Project	0.02	0.13	0.01	0.05	0.19	0.02	0.07	0.32	0.04	0.02	0.13	0.01
Morecambe Offshore Windfarm Generation Assets	0.04	0.43	0.09	0.02	0.19	0.03	0.05	0.62	0.13	0.04	0.43	0.09
Morgan Offshore Wind Project Generation Assets	0.02	0.07	0.04	0.05	0.09	0.06	0.07	0.16	0.09	0.02	0.07	0.04
Ormonde Wind Farm	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.00
Rampion Offshore Wind Farm	0.03		0.01	0.14	-	0.04	0.17	-	0.05	0.03		0.01
Rampion 2 Offshore Wind Farm	0.01		0.00	0.06	-	0.03	0.07	-	0.03	0.01		0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.05	0.04	0.03	0.05	0.23	0.23	0.10	0.27	0.25	0.05	0.04	0.03
West of Orkney Windfarm	0.04		0.02	0.07	-	0.04	0.11	-	0.06	0.04		0.02

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
White Cross Offshore Windfarm	0.02	0.01	0.00	0.03	0.06	0.00	0.05	0.07	0.01	0.02	0.01	0.00
Total predicted impact (adult birds)				**0.23**	**1.07**	**0.22**	**0.57**	**1.39**	**0.53**	**0.80**	**2.46**	**0.76**
Increase in baseline mortality (%)				**0.02%**	**0.11%**	**0.02%**	**0.06%**	**0.14%**	**0.06%**	**0.08%**	**0.25%**	**0.08%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**4.01 birds** **0.41% increase in baseline mortality**		

1.5.3.10 As the predicted impact on black-legged kittiwake from Ailsa Craig SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is note considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Ireland's Eye SPA

1.5.3.11 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Ireland's Eye SPA, an in-combination assessment is presented within Table 1-24 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-25 (30% displacement and 3% mortality).

Table 1.24: In-combination assessment for black-legged kittiwake from the Ireland's Eye SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0013	0.01	0.001	0.00 to 0.02	0.00 to 0.03	0.00 to 0.00	0.01	0.06	0.00	0.01 to 0.03	0.06 to 0.09	0.00 to 0.01

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Burbo Bank Extension Offshore Wind Farm	0.0013	0.010	0.001		0.01 to 0.27		0.00	0.13	0.00	0.00 to 0.00	0.14 to 0.40	0.00 to 0.00
Erebus Floating Wind Demo	0.0013	0.016	0.001	0.00 to 0.00	0.05 to 1.20	0.00 to 0.02	0.01	0.00	0.01	0.01 to 0.01	0.06 to 1.21	0.02 to 0.04
TwinHub (Wave Hub Floating Wind Farm)	0.0013	0.016	0.001	0.00 to 0.00	0.00 to 0.00	0.00 to 0.01	0.00	0.08	0.00	0.00 to 0.00	0.08 to 0.09	0.00 to 0.01
Mona Offshore Wind Project	0.0013	0.016	0.001	0.00 to 0.03	0.02 to 0.43	0.00 to 0.02	0.01	0.08	0.00	0.01 to 0.04	0.10 to 0.51	0.01 to 0.03
Morecambe Offshore Windfarm Generation Assets	0.0013	0.010	0.001	0.00 to 0.06	0.06 to 1.51	0.01 to 0.17	0.00	0.08	0.01	0.01 to 0.07	0.15 to 1.59	0.01 to 0.17
Morgan Offshore Wind Project Generation Assets	0.0013	0.013	0.001	0.00 to 0.04	0.01 to 0.22	0.00 to 0.07	0.01	0.03	0.01	0.01 to 0.05	0.04 to 0.26	0.02 to 0.08
Ormonde Wind Farm	0.0021	0.0104	0.0012	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.02	0.00	0.00 to 0.00	0.02 to 0.02	0.00 to 0.00
Rampion Offshore Wind Farm	0.0013	No connectivity	0.001	0.00 to 0.05		0.00 to 0.01	0.01	-	0.01	0.04 to 0.08		0.01 to 0.02
Rampion 2 Offshore Wind Farm	0.0013	No connectivity	0.001	0.00 to 0.02		0.00 to 0.00	0.01	-	0.01	0.01 to 0.03		0.01 to 0.01
Walney (3 and 4) Extension Offshore Wind Farm	0.0013	0.010	0.001	0.00 to 0.08	0.01 to 0.12	0.00 to 0.05	0.01	0.10	0.05	0.02 to 0.09	0.11 to 0.23	0.05 to 0.10

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
West of Orkney Windfarm	0.0013	No connectivity	0.001	0.00 to 0.07		0.00 to 0.03	0.01	-	0.01	0.02 to 0.08		0.01 to 0.04
White Cross Offshore Windfarm	0.0013	0.016	0.001	0.00 to 0.04	0.00 to 0.03	0.00 to 0.01	0.01	0.03	0.00	0.01 to 0.05	0.03 to 0.06	0.00 to 0.01
Total predicted impact (adult birds)				**0.02 to 0.40**	**0.16 to 3.83**	**0.02 to 0.39**	**0.13**	**0.63**	**0.12**	0.15 to 0.54	0.79 to 4.46	0.14 to 0.51
Increase in baseline mortality (%)				**0.00% to 0.09%**	**0.04% to 0.85%**	**0.00% to 0.09%**	**0.03%**	**0.14%**	**0.03%**	**0.03% to 0.12%**	**0.18% to 0.98%**	**0.03% to 0.11%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**1.08 to 5.50 birds** **0.11% to1.21 % increase in baseline mortality**		

1.5.3.12 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-25Table 1-19.

Table 1.25: In-combination assessment for black-legged kittiwake from the Ireland's Eye SPA – when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0013	0.01	0.001	0.00	0.00	0.00	0.01	0.06	0.00	0.01	0.07	0.01
Burbo Bank Extension Offshore Wind Farm	0.0013	0.010	0.001	0.00	0.04	0.00	0.00	0.13	0.00	0.00	0.16	0.00
Erebus Floating Wind Demo	0.0013	0.016	0.001	0.00	0.15	0.00	0.01	0.00	0.01	0.01	0.16	0.02
TwinHub (Wave Hub Floating Wind Farm)	0.0013	0.016	0.001	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.08	0.00
Mona Offshore Wind Project	0.0013	0.016	0.001	0.00	0.06	0.00	0.01	0.08	0.00	0.02	0.13	0.01
Morecambe Offshore Windfarm Generation Assets	0.0013	0.010	0.001	0.01	0.19	0.02	0.00	0.08	0.01	0.01	0.28	0.03
Morgan Offshore Wind Project Generation Assets	0.0013	0.013	0.001	0.00	0.03	0.01	0.01	0.03	0.01	0.02	0.06	0.02
Ormonde Wind Farm	0.0021	0.0104	0.0012	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.00
Rampion Offshore Wind Farm	0.0013	No connectivity	0.001	0.01		0.00	0.03	-	0.01	0.04	-	0.01
Rampion 2 Offshore Wind Farm	0.0013	No connectivity	0.001	0.00		0.00	0.01	-	0.01	0.02	-	0.01

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Walney (3 and 4) Extension Offshore Wind Farm	0.0013	0.010	0.001	0.01	0.02	0.01	0.01	0.10	0.05	0.02	0.12	0.06
West of Orkney Windfarm	0.0013	No connectivity	0.001	0.01	-	0.00	0.02	-	0.01	0.03	-	0.01
White Cross Offshore Windfarm	0.0013	0.016	0.001	0.01	0.00	0.00	0.01	0.03	0.00	0.01	0.03	0.00
Total predicted impact (adult birds)				0.05	0.49	0.05	0.13	0.63	0.12	0.18	1.12	0.17
Increase in baseline mortality (%)				0.01%	0.11%	0.01%	0.03%	0.14%	0.03%	0.04%	0.25%	0.04%
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**1.47 birds** **0.33% increase in baseline mortality**		

1.5.3.13 As the predicted impact on black-legged kittiwake from Ireland's Eye SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Howth Head Coast SPA

1.5.3.14 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Howth Head Coast SPA, an in-combination assessment is presented within Table 1-26 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-27 (30% displacement and 3% mortality).

Table 1.26: In-combination assessment for black-legged kittiwake from the Howth Head Coast SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.003	0.020	0.002	0.00 to 0.04	0.00 to 0.06	0.00 to 0.01	0.03	0.12	0.01	0.03 to 0.07	0.13 to 0.19	0.01 to 0.02
Burbo Bank Extension Offshore Wind Farm	0.003	0.024	0.002		0.03 to 0.63		0.00	0.29	0.00	0.00 to 0.00	0.32 to 0.92	0.00 to 0.00
Erebus Floating Wind Demo	0.003	0.033	0.002	0.00 to 0.00	0.11 to 2.48	0.00 to 0.05	0.02	0.01	0.03	0.02 to 0.02	0.12 to 2.49	0.04 to 0.09
TwinHub (Wave Hub Floating Wind Farm)	0.003	0.033	0.002	0.00 to 0.01	0.00 to 0.00	0.00 to 0.02	0.00	0.17	0.00	0.00 to 0.01	0.17 to 0.18	0.00 to 0.02
Mona Offshore Wind Project	0.003	0.018	0.002	0.00 to 0.08	0.02 to 0.49	0.00 to 0.06	0.02	0.09	0.01	0.03 to 0.11	0.11 to 0.58	0.01 to 0.07
Morecambe Offshore Windfarm Generation Assets	0.003	0.024	0.002	0.01 to 0.16	0.15 to 3.46	0.02 to 0.41	0.01	0.19	0.01	0.02 to 0.17	0.34 to 3.65	0.03 to 0.42
Morgan Offshore Wind Project Generation Assets	0.003	0.033	0.002	0.00 to 0.09	0.02 to 0.46	0.01 to 0.16	0.02	0.07	0.03	0.03 to 0.11	0.09 to 0.53	0.04 to 0.19
Ormonde Wind Farm	0.0021	0.0238	0.0012	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.04	0.00	0.00 to 0.00	0.04 to 0.04	0.00 to 0.00

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion Offshore Wind Farm	0.003	No connectivity	0.002	0.00 to 0.11		0.00 to 0.02	0.07	-	0.02	0.08 to 0.19		0.02 to 0.05
Rampion 2 Offshore Wind Farm	0.003	No connectivity	0.002	0.00 to 0.04		0.00 to 0.01	0.03	-	0.01	0.03 to 0.07		0.01 to 0.02
Walney (3 and 4) Extension Offshore Wind Farm	0.003	0.024	0.002	0.01 to 0.20	0.01 to 0.28	0.00 to 0.11	0.03	0.24	0.11	0.04 to 0.23	0.25 to 0.52	0.13 to 0.24
West of Orkney Windfarm	0.003	No connectivity	0.002	0.01 to 0.16		0.00 to 0.08	0.03	-	0.02	0.05 to 0.20		0.03 to 0.10
White Cross Offshore Windfarm	0.003	0.033	0.002	0.00 to 0.09	0.00 to 0.05	0.00 to 0.02	0.02	0.06	0.00	0.02 to 0.11	0.07 to 0.12	0.00 to 0.02
Total predicted impact (adult birds)				**0.04 to 0.97**	**0.34 to 7.92**	**0.04 to 0.95**	**0.32**	**1.29**	**0.29**	**0.36 to 1.29**	**1.63 to 9.22**	**0.34 to 1.24**
Increase in baseline mortality (%)				**0.01% to 0.19%**	**0.06% to 1.51%**	**0.01% to 0.18%**	**0.06%**	**0.25%**	**0.06%**	**0.07% to 0.25%**	**0.31% to 1.76%**	**0.06% to 0.24%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**2.33 to 11.74 birds 0.44% to 2.24% increase in baseline mortality**		

1.5.3.15 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-27.

Table 1.27: In-combination assessment for black-legged kittiwake from the Howth Head Coast SPA – when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.003	0.020	0.002	0.01	0.01	0.00	0.03	0.12	0.01	0.03	0.13	0.01
Burbo Bank Extension Offshore Wind Farm	0.003	0.024	0.002		0.08		0.00	0.29	0.00	0.00	0.37	0.00
Erebus Floating Wind Demo	0.003	0.033	0.002	0.00	0.32	0.01	0.02	0.01	0.04	0.02	0.33	0.04
TwinHub (Wave Hub Floating Wind Farm)	0.003	0.033	0.002	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.17	0.00
Mona Offshore Wind Project	0.003	0.018	0.002	0.01	0.06	0.01	0.03	0.09	0.01	0.04	0.15	0.02
Morecambe Offshore Windfarm Generation Assets	0.003	0.024	0.002	0.02	0.44	0.05	0.01	0.19	0.02	0.03	0.63	0.07
Morgan Offshore Wind Project Generation Assets	0.003	0.033	0.002	0.01	0.06	0.02	0.03	0.07	0.03	0.04	0.13	0.05
Ormonde Wind Farm	0.0021	0.0238	0.0012	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.00
Rampion Offshore Wind Farm	0.003	No connectivity	0.002	0.01		0.00	0.08	-	0.02	0.09	-	0.03
Rampion 2 Offshore Wind Farm	0.003	No connectivity	0.002	0.00		0.00	0.03	-	0.01	0.04	-	0.02

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Walney (3 and 4) Extension Offshore Wind Farm	0.003	0.024	0.002	0.03	0.04	0.01	0.03	0.24	0.12	0.05	0.27	0.14
West of Orkney Windfarm	0.003	No connectivity	0.002	0.02		0.01	0.04		0.02	0.06		0.03
White Cross Offshore Windfarm	0.003	0.033	0.002	0.01	0.01	0.00	0.02	0.06	0.00	0.03	0.07	0.00
Total predicted impact (adult birds)				**0.12**	**1.02**	**0.12**	**0.32**	**1.29**	**0.29**	**0.44**	**2.31**	**0.42**
Increase in baseline mortality (%)				**0.02%**	**0.19%**	**0.02%**	**0.06%**	**0.25%**	**0.06%**	**0.08%**	**0.44%**	**0.08%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**3.17 birds 0.61% increase in baseline mortality**		

1.5.3.16 As the predicted impact on black-legged kittiwake from Howth Head Coast SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objects of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Wicklow Head SPA

1.5.3.17 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Wicklow Head SPA, an in-combination assessment is presented within Table 1-28 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-29 (30% displacement and 3% mortality).

Table 1.28: In-combination assessment for black-legged kittiwake from the Wicklow Head SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement nd10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.008	0.005	0.006	0.00 to 0.09	0.00 to 0.02	0.00 to 0.02	0.07	0.03	0.03	0.07 to 0.15	0.03 to 0.05	0.03 to 0.04
Burbo Bank Extension Offshore Wind Farm	0.008	0.004	0.006		0.00 to 0.11		0.00	0.05	0.00	0.00 to 0.00	0.05 to 0.15	0.00 to 0.00
Erebus Floating Wind Demo	0.008	0.013	0.006	0.00 to 0.00	0.04 to 0.98	0.00 to 0.11	0.05	-	0.08	0.05 to 0.05	0.05 to 0.98	0.08 to 0.19
TwinHub (Wave Hub Floating Wind Farm)	0.008	0.013	0.006	0.00 to 0.02	0.00 to 0.00	0.00 to 0.04	0.00	-	0.00	0.00 to 0.02	0.07 to 0.07	0.00 to 0.04
Mona Offshore Wind Project	0.008	0.006	0.006	0.01 to 0.17	0.01 to 0.16	0.01 to 0.13	0.06	0.03	0.03	0.07 to 0.23	0.04 to 0.19	0.03 to 0.15
Morecambe Offshore Windfarm Generation Assets	0.008	0.004	0.006	0.01 to 0.35	0.02 to 0.58	0.04 to 0.90	0.02	0.03	0.04	0.04 to 0.37	0.06 to 0.61	0.08 to 0.94
Morgan Offshore Wind Project Generation Assets	0.008	0.004	0.006	0.01 to 0.19	0.00 to 0.07	0.02 to 0.36	0.06	0.01	0.07	0.06 to 0.25	0.01 to 0.08	0.08 to 0.43
Ormonde Wind Farm	0.0021	0.004	0.0012	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.01	0.00	0.00 to 0.00	0.01 to 0.01	0.00 to 0.00

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement nd10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion Offshore Wind Farm	0.008	No connectivity	0.006	0.01 to 0.25		0.00 to 0.05	0.18	-	0.05	0.19 to 0.43		0.05 to 0.10
Rampion 2 Offshore Wind Farm	0.008	No connectivity	0.006	0.00 to 0.09		0.00 to 0.02	0.07	-	0.03	0.08 to 0.16		0.03 to 0.05
Walney (3 and 4) Extension Offshore Wind Farm	0.008	0.004	0.006	0.02 to 0.44	0.00 to 0.05	0.01 to 0.25	0.06	0.04	0.28	0.08 to 0.50	0.04 to 0.09	0.29 to 0.52
West of Orkney Windfarm	0.008	No connectivity	0.006	0.02 to 0.36		0.01 to 0.18	0.09	-	0.05	0.10 to 0.45		0.06 to 0.23
White Cross Offshore Windfarm	0.008	0.013	0.006	0.01 to 0.21	0.00 to 0.02	0.00 to 0.04	0.04	0.03	0.01	0.05 to 0.25	0.03 to 0.05	0.01 to 0.04
Total predicted impact (adult birds)				**0.09 to 2.16**	**0.08 to 1.98**	**0.09 to 2.10**	**0.70**	**0.22**	**0.65**	**0.80 to 2.86**	**0.38 to 2.28**	**0.74 to 2.76**
Increase in baseline mortality (%)				**0.05% to 1.10%**	**0.04% to 1.01%**	**0.05% to 1.07%**	**0.36%**	**0.11%**	**0.33%**	**0.40% to 1.45%**	**0.19% to 1.16%**	**0.38% to 1.40%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement to 1% mortality to 70% displacement and 10% mortality)										**1.92 to 7.90 birds 0.98% to 4.01% increase in baseline mortality**		

1.5.3.18 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-29.

Table 1.29: In-combination assessment for black-legged kittiwake from the Wicklow Head SPA – when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.008	0.005	0.006	0.01	0.00	0.00	0.07	0.03	0.03	0.08	0.03	0.03
Burbo Bank Extension Offshore Wind Farm	0.008	0.004	0.006	0.00	0.01	0.00	0.00	0.05	0.00	0.00	0.06	0.00
Erebus Floating Wind Demo	0.008	0.013	0.006	0.00	0.13	0.01	0.05	-	0.08	0.05	-	0.09
TwinHub (Wave Hub Floating Wind Farm)	0.008	0.013	0.006	0.00	0.00	0.01	0.00	-	0.00	0.00	-	0.01
Mona Offshore Wind Project	0.008	0.006	0.006	0.02	0.02	0.02	0.06	0.03	0.03	0.09	0.05	0.04
Morecambe Offshore Windfarm Generation Assets	0.008	0.004	0.006	0.04	0.07	0.12	0.02	0.03	0.04	0.07	0.11	0.15
Morgan Offshore Wind Project Generation Assets	0.008	0.004	0.006	0.02	0.01	0.05	0.06	0.01	0.07	0.08	0.02	0.12
Ormonde Wind Farm	0.0021	0.004	0.0012	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
Rampion Offshore Wind Farm	0.008	No connectivity	0.006	0.03	-	0.01	0.18	-	0.05	0.21	-	0.06
Rampion 2 Offshore Wind Farm	0.008	No connectivity	0.006	0.01	-	0.00	0.07	-	0.03	0.08	-	0.03

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Walney (3 and 4) Extension Offshore Wind Farm	0.008	0.004	0.006	0.06	0.01	0.03	0.06	0.04	0.28	0.12	0.05	0.31
West of Orkney Windfarm	0.008	No connectivity	0.006	0.05	-	0.02	0.09	-	0.05	0.14	-	0.08
White Cross Offshore Windfarm	0.008	0.013	0.006	0.03	0.00	0.00	0.04	0.03	0.01	0.07	0.03	0.01
Total predicted impact (adult birds)				**0.28**	**0.25**	**0.27**	**0.70**	**0.22**	**0.65**	**0.98**	**0.35**	**0.93**
Increase in baseline mortality (%)				**0.14%**	**0.13%**	**0.14%**	**0.36%**	**0.11%**	**0.33%**	**0.50%**	**0.18%**	**0.47%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**2.26 birds 1.15% increase in baseline mortality**		

1.5.3.19 As the predicted impact on black-legged kittiwake from Wicklow Head SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.2) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Cape Wrath SPA

1.5.3.20 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Cape Wrath SPA, an in-combination assessment is presented within Table 1-30 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-31 (30% displacement and 3% mortality).

Table 1.30: In-combination assessment for black-legged kittiwake from the Cape Wrath – when considering the 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.044	No connectivity	0.0249	0.02 to 0.49	-	0.00 to 0.08	0.36	-	0.11	0.38 to 0.85	-	0.11 to 0.19
Burbo Bank Extension Offshore Wind Farm	0.044	No connectivity	0.0249		-		0.00	-	0.00	0.00 to 0.00	-	0.00 to 0.00
Erebus Floating Wind Demo	0.044	No connectivity	0.0249	0.00 to 0.00	-	0.02 to 0.47	0.29	-	0.33	0.29 to 0.30	-	0.35 to 0.80
TwinHub (Wave Hub Floating Wind Farm)	0.044	No connectivity	0.0249	0.00 to 0.09	-	0.01 to 0.18	0.00	-	0.00	0.00 to 0.09	-	0.01 to 0.18
Mona Offshore Wind Project	0.044	No connectivity	0.0249	0.04 to 0.94	-	0.02 to 0.52	0.35	-	0.11	0.39 to 1.29	-	0.13 to 0.63
Morecambe Offshore Windfarm Generation Assets	0.044	No connectivity	0.0249	0.08 to 1.90	-	0.16 to 3.75	0.12	-	0.15	0.21 to 2.03	-	0.31 to 3.91

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Morgan Offshore Wind Project Generation Assets	0.044	No connectivity	0.0249	0.05 to 1.06	-	0.06 to 1.50	0.31	-	0.29	0.35 to 1.37	-	0.35 to 1.79
Ormonde Wind Farm	0.044	No connectivity	0.0249	0.00 to 0.00	-	0.00 to 0.00	0.00	-	0.00	0.00 to 0.00	-	0.00 to 0.00
Rampion Offshore Wind Farm	0.044	No connectivity	0.0249	0.06 to 1.36	-	0.01 to 0.21	0.98	-	0.21	1.04 to 2.34	-	0.22 to 0.42
Rampion 2 Offshore Wind Farm	0.044	No connectivity	0.0249	0.02 to 0.47	-	0.00 to 0.09	0.40	-	0.13	0.42 to 0.87	-	0.14 to 0.22
Walney (3 and 4) Extension Offshore Wind Farm	0.044	No connectivity	0.0249	0.10 to 2.40	-	0.04 to 1.03	0.36	-	1.14	0.46 to 2.76	-	1.19 to 2.18
West of Orkney Windfarm	0.044	No connectivity	0.0249	0.09 to 1.99	-	0.03 to 0.74	0.49	-	0.22	0.58 to 2.49	-	0.25 to 0.96
White Cross Offshore Windfarm	0.044	No connectivity	0.0249	0.05 to 1.14	-	0.01 to 0.16	0.22	-	0.02	0.27 to 1.36	-	0.03 to 0.18
Total predicted impact (adult birds)				**0.51 to 11.85**	**N/A**	**0.37 to 8.72**	**3.87**	**N/A**	**2.72**	**4.38 to 15.73**	**N/A**	**3.09 to 11.44**
Increase in baseline mortality (%)				**0.02% to 0.39%**	**N/A**	**0.01% to 0.29%**	**0.13%**	**N/A**	**0.09%**	**0.15% to 0.52%**	**N/A**	**0.10% to 0.38%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**7.47 to 27.17 birds** **0.25 to 0.90% increase in baseline mortality**		

1.5.3.21 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-31.

Table 1.31: In-combination assessment for black-legged kittiwake from the Cape Wrath SPA – when considering the 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.044	No connectivity	0.0249	0.36	-	0.11	0.42	-	0.12	0.36	-	0.11
Burbo Bank Extension Offshore Wind Farm	0.044	No connectivity	0.0249	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00
Erebus Floating Wind Demo	0.044	No connectivity	0.0249	0.29	-	0.33	0.29	-	0.39	0.29	-	0.33
TwinHub (Wave Hub Floating Wind Farm)	0.044	No connectivity	0.0249	0.00	-	0.00	0.01	-	0.02	0.00	-	0.00
Mona Offshore Wind Project	0.044	No connectivity	0.0249	0.35	-	0.11	0.47	-	0.18	0.35	-	0.11
Morecambe Offshore Windfarm Generation Assets	0.044	No connectivity	0.0249	0.12	-	0.15	0.37	-	0.64	0.12	-	0.15
Morgan Offshore Wind Project Generation Assets	0.044	No connectivity	0.0249	0.31	-	0.29	0.44	-	0.48	0.31	-	0.29
Ormonde Wind Farm	0.044	No connectivity	0.0249	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00
Rampion Offshore Wind Farm	0.044	No connectivity	0.0249	0.98	-	0.21	1.15	-	0.24	0.98	-	0.21

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion 2 Offshore Wind Farm	0.044	No connectivity	0.0249	0.40	-	0.13	0.46	-	0.14	0.40	-	0.13
Walney (3 and 4) Extension Offshore Wind Farm	0.044	No connectivity	0.0249	0.36	-	1.14	0.66	-	1.28	0.36	-	1.14
West of Orkney Windfarm	0.044	No connectivity	0.0249	0.49	-	0.22	0.75	-	0.31	0.49	-	0.22
White Cross Offshore Windfarm	0.044	No connectivity	0.0249	0.22	-	0.02	0.36	-	0.05	0.22	-	0.02
Total predicted impact (adult birds)				**3.87**	**0.00**	**2.72**	**5.40**	**0.00**	**3.84**	**3.87**	**0.00**	**2.72**
Increase in baseline mortality (%)				**0.13%**	**0.00%**	**0.09%**	**0.18%**	**0.00%**	**0.13%**	**0.13%**	**0.00%**	**0.09%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**9.24 birds** **0.31% increase in baseline mortality**		

1.5.3.22 As the predicted impact on black-legged kittiwake from Cape Wrath SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

North Colonsay and Western Cliffs SPA

1.5.3.23 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from North Colonsay and Western Cliffs SPA, an in-combination assessment is presented within Table 1-32 (70% displacement and 10% mortality) and Table 1-33 (30% displacement and 3% mortality).

Table 1.32: In-combination assessment for black-legged kittiwake from the North Colonsay and Western Cliffs SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement to 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0237	No connectivity	0.0134	0.01 to 0.26	-	0.00 to 0.04	0.19	-	0.06	0.20 to 0.46	-	0.06 to 0.10
Burbo Bank Extension Offshore Wind Farm	0.0237	No connectivity	0.0134		-		0.00	-	0.00	0.00 to 0.00	-	0.00 to 0.00
Erebus Floating Wind Demo	0.0237	No connectivity	0.0134	0.00 to 0.00	-	0.01 to 0.25	0.16	-	0.18	0.16 to 0.16	-	0.19 to 0.43
TwinHub (Wave Hub Floating Wind Farm)	0.0237	No connectivity	0.0134	0.00 to 0.05	-	0.00 to 0.09	0.00	-	0.00	0.00 to 0.05	-	0.00 to 0.09
Mona Offshore Wind Project	0.0237	No connectivity	0.0134	0.02 to 0.51	-	0.01 to 0.28	0.19	-	0.06	0.21 to 0.70	-	0.07 to 0.34
Morecambe Offshore Windfarm Generation Assets	0.0237	No connectivity	0.0134	0.04 to 1.02	-	0.09 to 2.02	0.07	-	0.08	0.11 to 1.09	-	0.17 to 2.10
Morgan Offshore Wind Project Generation Assets	0.0237	No connectivity	0.0134	0.02 to 0.57	-	0.03 to 0.81	0.17	-	0.15	0.19 to 0.74	-	0.19 to 0.96

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement to 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion Offshore Wind Farm	0.0237	No connectivity	0.0134	0.03 to 0.73	-	0.00 to 0.11	0.53	-	0.11	0.56 to 1.26	-	0.12 to 0.22
Rampion 2 Offshore Wind Farm	0.0237	No connectivity	0.0134	0.01 to 0.25	-	0.00 to 0.05	0.21	-	0.07	0.23 to 0.47	-	0.07 to 0.12
Walney (3 and 4) Extension Offshore Wind Farm	0.0237	No connectivity	0.0134	0.06 to 1.29	-	0.02 to 0.56	0.19	-	0.62	0.25 to 1.49	-	0.64 to 1.17
West of Orkney Windfarm	0.0237	No connectivity	0.0134	0.05 to 1.07	-	0.02 to 0.40	0.19	-	0.62	0.31 to 1.34	-	0.13 to 0.52
White Cross Offshore Windfarm	0.0237	No connectivity	0.0134	0.03 to 0.62	-	0.00 to 0.09	0.12	-	0.01	0.14 to 0.73	-	0.02 to 0.10
Total predicted impact (adult birds)				**0.27 to 6.39**	**N/A**	**0.20 to 4.69**	**2.09**	**N/A**	**1.46**	**2.36 to 8.47**	**N/A**	**1.66 to 6.16**
Increase in baseline mortality (%)				**0.01% to 0.39%**	**N/A**	**0.01% to 0.29%**	**0.13%**	**N/A**	**0.09%**	**0.08% to 0.52%**	**N/A**	**0.06% to 0.38%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)										**4.02 to 14.63 birds 0.13% to 0.90 % increase in baseline mortality**		

1.5.3.24 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-33.

Table 1.33: In-combination assessment for black-legged kittiwake from the North Colonsay and Western Cliffs SPA – when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0237	No connectivity	0.0134	0.03	-	0.01	0.19	-	0.06	0.23	-	0.06
Burbo Bank Extension Offshore Wind Farm	0.0237	No connectivity	0.0134	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00
Erebus Floating Wind Demo	0.0237	No connectivity	0.0134	0.00	-	0.03	0.16	-	0.18	0.16	-	0.21
TwinHub (Wave Hub Floating Wind Farm)	0.0237	No connectivity	0.0134	0.01	-	0.01	0.00	-	0.00	0.01	-	0.01
Mona Offshore Wind Project	0.0237	No connectivity	0.0134	0.07	-	0.04	0.19	-	0.06	0.25	-	0.10
Morecambe Offshore Windfarm Generation Assets	0.0237	No connectivity	0.0134	0.13	-	0.26	0.07	-	0.08	0.20	-	0.34
Morgan Offshore Wind Project Generation Assets	0.0237	No connectivity	0.0134	0.07	-	0.10	0.17	-	0.15	0.24	-	0.26
Rampion Offshore Wind Farm	0.0237	No connectivity	0.0134	0.09	-	0.01	0.53	-	0.11	0.62	-	0.13
Rampion 2 Offshore Wind Farm	0.0237	No connectivity	0.0134	0.03	-	0.01	0.21	-	0.07	0.25	-	0.08
Walney (3 and 4) Extension Offshore Wind Farm	0.0237	No connectivity	0.0134	0.17	-	0.07	0.19	-	0.62	0.36	-	0.69

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
West of Orkney Windfarm	0.0237	No connectivity	0.0134	0.14	-	0.05	0.26	-	0.12	0.40	-	0.17
White Cross Offshore Windfarm	0.0237	No connectivity	0.0134	0.08	-	0.01	0.12	-	0.01	0.20	-	0.02
Total predicted impact (adult birds)				**0.82**	**0.00**	**0.60**	**2.09**	**0.00**	**1.46**	**2.91**	**0.00**	**2.07**
Increase in baseline mortality (%)				**0.05%**	**0.00%**	**0.04%**	**0.13%**	**0.00%**	**0.09%**	**0.18%**	**0.00%**	**0.13%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**4.69 birds 0.31 % increase in baseline mortality**		

1.5.3.25 As the predicted impact on black-legged kittiwake from North Colonsay and Western Cliffs SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.5.3.26 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, an in-combination assessment is presented within Table 1-34 (30% displacement and 1% mortality to 70% displacement and 10% mortality) and Table 1-35 (30% displacement and 3% mortality).

Table 1.34: In-combination assessment for black-legged kittiwake from the Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA – when considering 30-70% displacement and 1-10% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breedir
Awel y Môr Offshore Wind Farm	0.0045	0.004	0.0025	0.00 to 0.05	0.00 to 0.01	0.00 to 0.01	0.04	0.02	0.01	0.04 to 0.09	0.03 to 0.04	0.01 to
Burbo Bank Extension Offshore Wind Farm	0.0045	0.003	0.0025	0.00 to 0.00	0.00 to 0.08	0.00 to 0.00	0.00	0.04	0.00	0.00 to 0.00	0.04 to 0.12	0.00 to
Erebus Floating Wind Demo	0.0045	0.817	0.0025	0.00 to 0.00	2.64 to 61.52	0.00 to 0.05	0.03	0.22	0.03	0.03 to 0.03	2.85 to 61.74	0.03 to
TwinHub (Wave Hub Floating Wind Farm)	0.0045	0.817	0.0025	0.00 to 0.01	0.01 to 0.12	0.00 to 0.02	0.00	4.30	0.00	0.00 to 0.01	4.31 to 4.42	0.00 to
Mona Offshore Wind Project	0.0045	0.002	0.0025	0.00 to 0.10	0.00 to 0.05	0.00 to 0.05	0.04	0.01	0.01	0.04 to 0.13	0.01 to 0.06	0.01 to
Morecambe Offshore Windfarm Generation Assets	0.0045	0.003	0.0025	0.01 to 0.19	0.02 to 0.44	0.02 to 0.38	0.01	0.02	0.02	0.02 to 0.21	0.04 to 0.46	0.03 to

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement and 1% mortality to 70% displacement and 10% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breedir
Morgan Offshore Wind Project Generation Assets	0.0045	0.002	0.0025	0.00 to 0.11	0.00 to 0.03	0.01 to 0.15	0.03	0.01	0.03	0.04 to 0.14	0.01 to 0.04	0.04 to
Ormonde Wind Farm	0.0045	0.003	0.0025	0.00 to 0.00	0.00 to 0.00	0.00 to 0.00	0.00	0.01	0.00	0.00 to 0.00	0.01 to 0.01	0.00 to
Rampion Offshore Wind Farm	0.0045	No connectivity	0.0025	0.01 to 0.14		0.00 to 0.02	0.10	-	0.02	0.11 to 0.24		0.02 to
Rampion 2 Offshore Wind Farm	0.0045	No connectivity	0.0025	0.00 to 0.05		0.00 to 0.01	0.04	-	0.01	0.04 to 0.09		0.01 to
Walney (3 and 4) Extension Offshore Wind Farm	0.0045	0.003	0.0025	0.01 to 0.25	0.00 to 0.04	0.00 to 0.10	0.04	0.03	0.11	0.05 to 0.28	0.03 to 0.07	0.12 to
West of Orkney Windfarm	0.0045	No connectivity	0.0025	0.01 to 0.20		0.00 to 0.07	0.05	-	0.02	0.06 to 0.25		0.03 to
White Cross Offshore Windfarm	0.0045	0.817	0.0025	0.01 to 0.12	0.06 to 1.34	0.00 to 0.02	0.02	1.61	0.00	0.03 to 0.14	1.67 to 2.95	0.00 to
Total predicted impact (adult birds)			**0.05 to 0.12**	**2.73 to 1.34**	**0.04 to 0.02**	**0.40**	**6.26**	**0.27**	**0.45 to 1.61**		**8.99 to 69.90**	**0.31 to 1.15**
Increase in baseline mortality (%)			**0.02% to 0.41%**	**0.93% to 21.64%**	**0.01% to 0.30%**	**0.13%**	**2.13%**	**0.09%**	**0.15% to 0.55%**		**3.06% to 23.77%**	**0.11% t 0.39%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 1% mortality to 70% displacement and 10% mortality)						**9.75 to 72.65 birds 3.32% to 24.71% increase in baseline mortality**						

1.5.3.27 As previously discussed (section 1.1.2) the Applicant is not proposing to undertaken PVA on the worst-case scenario as advised by JNCC, due to lack of empirical evidence for a displacement rate of 70% and a mortality rate of 10% therefore the Applicant has presented the NatureScot guidance of 30% displacement and 3% mortality within Table 1-35.

Table 1.35: In-combination assessment for black-legged kittiwake from the Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA – when considering 30% displacement and 3% mortality.

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Awel y Môr Offshore Wind Farm	0.0045	0.004	0.0025	0.01	0.00	0.00	0.04	0.02	0.01	0.04	0.03	0.01
Burbo Bank Extension Offshore Wind Farm	0.0045	0.003	0.0025	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.05	0.00
Erebus Floating Wind Demo	0.0045	0.817	0.0025	0.00	7.91	0.01	0.03	0.22	0.03	0.03	8.13	0.04
TwinHub (Wave Hub Floating Wind Farm)	0.0045	0.817	0.0025	0.00	0.02	0.00	0.00	4.30	0.00	0.00	4.32	0.00
Mona Offshore Wind Project	0.0045	0.002	0.0025	0.01	0.01	0.01	0.04	0.01	0.01	0.05	0.02	0.02
Morecambe Offshore Windfarm Generation Assets	0.0045	0.003	0.0025	0.03	0.06	0.05	0.01	0.02	0.02	0.04	0.08	0.06
Morgan Offshore Wind Project Generation Assets	0.0045	0.002	0.0025	0.01	0.00	0.02	0.03	0.01	0.03	0.05	0.01	0.05
Ormonde Wind Farm	0.0045	0.003	0.0025	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
Rampion Offshore Wind Farm	0.0045	No connectivity	0.0025	0.02	-	0.00	0.10	-	0.02	0.12	-	0.02

Plan or project	Apportioning values			Apportioned displacement impact values (30% displacement, 3% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact		
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding
Rampion 2 Offshore Wind Farm	0.0045	No connectivity	0.0025	0.01	-	0.00	0.04	-	0.01	0.05	-	0.01
Walney (3 and 4) Extension Offshore Wind Farm	0.0045	0.003	0.0025	0.03	0.00	0.01	0.04	0.03	0.11	0.07	0.03	0.13
West of Orkney Windfarm	0.0045	No connectivity	0.0025	0.03	-	0.01	0.05	-	0.02	0.08	-	0.03
White Cross Offshore Windfarm	0.0045	0.817	0.0025	0.02	0.17	0.00	0.02	1.61	0.00	0.04	1.78	0.00
Total predicted impact (adult birds)				**0.16**	**8.18**	**0.11**	**0.40**	**6.26**	**0.27**	**0.55**	**14.45**	**0.39**
Increase in baseline mortality (%)				**0.05%**	**2.78%**	**0.04%**	**0.13%**	**2.13%**	**0.09%**	**0.19%**	**4.91%**	**0.13%**
Annual impact and increase in baseline mortality from the combined impact (when considering 30% displacement and 3% mortality)										**15.38 birds 5.23% increase in baseline mortality**		

1.5.3.28 As the predicted impact on black-legged kittiwake from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.2) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Common guillemot

Sule Skerry and Sule Stack SPA

1.5.3.29 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Sule Skerry and Sule Stack SPA, an in-combination assessment is presented within Table 1-36 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.36: In-combination assessment for common guillemot from the Sule Skerry and Sule Stack SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0221	0.11 to 2.60	N/A	0.11 to 2.60	0.52	N/A	0.52
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0221	0.06 to 1.39	N/A	0.06 to 1.39	0.28	N/A	0.28
Erebus Floating Wind Demo	No connectivity	0.0221	1.08 to 25.19	N/A	1.08 to 25.19	5.04	N/A	5.04
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0221	0.01 to 0.19	N/A	0.01 to 0.19	0.04	N/A	0.04
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0221	0.07 to 1.71	N/A	0.07 to 1.71	0.34	N/A	0.34
West of Orkney Windfarm	0.9145	0.0221	7.83 to 182.64	7.66 to 178.84	0.16 to 3.80	0.76	35.77	0.76
White Cross Offshore Windfarm	No connectivity	0.0221	0.04 to 0.94	N/A	0.04 to 0.94	0.19	N/A	0.19
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0221	0.29 to 6.80	N/A	0.29 to 6.80	1.36	N/A	1.36
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0221	0.16 to 3.65	N/A	0.16 to 3.65	0.73	N/A	0.73
Mona Offshore Wind Project	No connectivity	0.0221	0.14 to 3.34	N/A	0.14 to 3.34	0.67	N/A	0.67

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Total predicted impact (adult birds)			**9.79 to 228.45**	**7.66 to 178.84**	**2.13 to 49.61**	**45.69**	**35.77**	**9.92**
Increase in baseline mortality (%)			**1.05% to 24.54%**	**0.82% to 19.21%**	**0.23% to 5.33%**	**4.91%**	**19.21%**	**1.07%**

1.5.3.28 As the predicted impact on common guillemot from Sule Skerry and Sule Stack SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

North Rona and Sula Sgeir SPA

1.5.3.30 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot North Rona and Sula Sgeir SPA, an in-combination assessment is presented within Table 1-37 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.37: In-combination assessment for common guillemot from the North Rona and Sula Sgeir SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0145	0.07 to 1.70	N/A	0.07 to 1.70	0.34	N/A	0.34
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0145	0.04 to 0.91	N/A	0.04 to 0.91	0.18	N/A	0.18
Erebus Floating Wind Demo	No connectivity	0.0145	0.71 to 16.53	N/A	0.71 to 16.53	3.31	N/A	3.31
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0145	0.01 to 0.13	N/A	0.01 to 0.13	0.03	N/A	0.03
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0145	0.05 to 1.12	N/A	0.05 to 1.12	0.22	N/A	0.22
West of Orkney Windfarm	0.0002	0.0145	0.11 to 2.53	0.00 to 0.04	0.11 to 2.49	0.51	0.01	0.50
White Cross Offshore Windfarm	No connectivity	0.0145	0.03 to 0.62	N/A	0.03 to 0.62	0.12	N/A	0.12
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0145	0.19 to 4.46	N/A	0.19 to 4.46	0.89	N/A	0.89
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0145	0.10 to 2.39	N/A	0.10 to 2.39	0.48	N/A	0.48
Mona Offshore Wind Project	No connectivity	0.0145	0.09 to 2.19	N/A	0.09 to 2.19	0.44	N/A	0.44
Total predicted impact (adult birds)			**1.40 to 32.59**	**0.00 to 0.04**	**1.40 to 32.55**	**6.52**	**0.01**	**6.51**

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Increase in baseline mortality (%)			**0.23% to 5.34%**	**0.00% to 0.01%**	**0.23% to 5.34%**	**1.07%**	**0.00%**	**1.07%**

1.5.3.31 As the predicted impact on common guillemot from North Rona and Sula Sgeir SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Cape Wrath SPA

1.5.3.32 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Cape Wrath SPA, an in-combination assessment is presented within Table 1-38 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.38: In-combination assessment for Common guillemot from the Cape Wrath SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0792	0.40 to 9.30	N/A	0.40 to 9.30	1.86	N/A	1.86
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0792	0.21 to 4.97	N/A	0.21 to 4.97	0.99	N/A	0.99
Erebus Floating Wind Demo	No connectivity	0.0792	3.87 to 90.29	N/A	3.87 to 90.29	18.06	N/A	18.06
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0792	0.03 to 0.69	N/A	0.03 to 0.69	0.14	N/A	0.14
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0792	0.26 to 6.14	N/A	0.26 to 6.14	1.23	N/A	1.23
West of Orkney Windfarm	0.0248	0.0792	0.79 to 18.47	0.21 to 4.85	0.58 to 13.62	2.72	0.97	2.72
White Cross Offshore Windfarm	No connectivity	0.0792	0.14 to 3.37	N/A	0.14 to 3.37	0.67	N/A	0.67

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0792	1.04 to 24.36	N/A	1.04 to 24.36	4.87	N/A	4.87
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0792	0.56 to 13.07	N/A	0.56 to 13.07	2.61	N/A	2.61
Mona Offshore Wind Project	No connectivity	0.0792	0.51 to 11.97	N/A	0.51 to 11.97	2.39	N/A	2.39
Total predicted impact (adult birds)			**7.83 to 182.64**	**0.21 to 4.85**	**7.62 to 177.79**	**36.53**	**0.97**	**35.56**
Increase in baseline mortality (%)			**0.23% to 5.47%**	**0.01% to 0.15%**	**0.23% to 5.33%**	**1.09%**	**0.03%**	**1.07%**

1.5.3.33 As the predicted impact on common guillemot from Cape Wrath SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to conclude an if AEoSI can be ruled out beyond reasonable scientific doubt.

Handa SPA

1.5.3.34 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Handa SPA, an in-combination assessment is presented within Table 1-39 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.39: In-combination assessment for common guillemot from the Handa SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.11	0.55 to 12.92	N/A	0.55 to 12.92	2.58	N/A	2.58
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.11	0.30 to 6.91	N/A	0.30 to 6.91	1.38	N/A	1.38
Erebus Floating Wind Demo	No connectivity	0.11	5.37 to 125.40	N/A	5.37 to 125.40	25.08	N/A	25.08
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.11	0.04 to 0.96	N/A	0.04 to 0.96	0.19	N/A	0.19
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.11	0.37 to 8.53	N/A	0.37 to 8.53	1.71	N/A	1.71
West of Orkney Windfarm	0.0116	0.11	0.91 to 21.19	0.10 to 2.27	0.81 to 18.92	3.78	0.45	3.78
White Cross Offshore Windfarm	No connectivity	0.11	0.20 to 4.69	N/A	0.20 to 4.69	0.94	N/A	0.94
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.11	1.45 to 33.84	N/A	1.45 to 33.84	6.77	N/A	6.77
Morgan Offshore Wind Project Generation Assets	No connectivity	0.11	0.78 to 18.15	N/A	0.78 to 18.15	3.63	N/A	3.63
Mona Offshore Wind Project	No connectivity	0.11	0.71 to 16.62	N/A	0.71 to 16.62	3.32	N/A	3.32
Total predicted impact (adult birds)			**10.68 to 249.20**	**0.10 to 2.27**	**10.58 to 246.93**	**49.84**	**0.45**	**49.39**
Increase in baseline mortality (%)			**0.23% to 5.38%**	**0.00% to 0.05%**	**0.23% to 5.33%**	**1.08%**	**0.01%**	**1.07%**

1.5.3.35 As the predicted impact on common guillemot from Handa SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Shiant Isles SPA

1.5.3.36 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from the Shiant Isles SPA, an in-combination assessment is presented within Table 1-40 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.40: In-combination assessment for common guillemot from the Shiant Isles SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0149	0.07 to 1.75	N/A	0.07 to 1.75	0.35	N/A	0.35
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0149	0.04 to 0.94	N/A	0.04 to 0.94	0.19	N/A	0.19
Erebus Floating Wind Demo	No connectivity	0.0149	0.73 to 16.99	N/A	0.73 to 16.99	3.40	N/A	3.40
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0149	0.01 to 0.13	N/A	0.01 to 0.13	0.03	N/A	0.03
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0149	0.05 to 1.16	N/A	0.05 to 1.16	0.23	N/A	0.23
West of Orkney Windfarm	0.0002	0.0149	0.11 to 2.60	0.00 to 0.04	0.11 to 2.56	0.51	0.01	0.51
White Cross Offshore Windfarm	No connectivity	0.0149	0.03 to 0.63	N/A	0.03 to 0.63	0.13	N/A	0.13
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0149	0.20 to 4.58	N/A	0.20 to 4.58	0.92	N/A	0.92
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0149	0.11 to 2.46	N/A	0.11 to 2.46	0.49	N/A	0.49

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Mona Offshore Wind Project	No connectivity	0.0149	0.10 to 2.25	N/A	0.10 to 2.25	0.45	N/A	0.45
Total predicted impact (adult birds)			**1.44 to 33.49**	**0.00 to 0.04**	**1.43 to 33.45**	**6.70**	**0.01**	**6.69**
Increase in baseline mortality (%)			**0.23% to 5.33%**	**0.00% to 0.01%**	**0.23% to 5.33%**	**1.07%**	**0.00%**	**1.07%**

1.5.3.37 As the predicted impact on common guillemot from Shiant Isles SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Flannan Isles SPA

1.5.3.38 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from the Flannan Isles SPA, an in-combination assessment is presented within Table 1-41 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.41: In-combination assessment of for common guillemot from the Flannan Isles SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0284	0.14 to 3.34	N/A	0.14 to 3.34	0.67	N/A	0.67
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0284	0.08 to 1.78	N/A	0.08 to 1.78	0.36	N/A	0.36
Erebus Floating Wind Demo	No connectivity	0.0284	1.39 to 32.38	N/A	1.39 to 32.38	6.48	N/A	6.48
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0284	0.01 to 0.25	N/A	0.01 to 0.25	0.05	N/A	0.05
West of Duddon Sands Offshore Wind Farm	No connectivity	0.0284	0.09 to 2.20	N/A	0.09 to 2.20	0.44	N/A	0.44
West of Orkney Windfarm	No connectivity	0.0284	0.21 to 4.88	N/A	0.21 to 4.88	0.98	N/A	0.98
White Cross Offshore Windfarm	No connectivity	0.0284	0.05 to 1.21	N/A	0.05 to 1.21	0.24	N/A	0.24
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0284	0.37 to 8.74	N/A	0.37 to 8.74	1.75	N/A	1.75
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0284	0.20 to 4.69	N/A	0.20 to 4.69	0.94	N/A	0.94
Mona Offshore Wind Project	No connectivity	0.0284	0.18 to 4.29	N/A	0.18 to 4.29	0.86	N/A	0.86
Total predicted impact (adult birds)			**2.73 to 63.75**	**0.00 to 0.00**	**2.73 to 63.75**	**12.75**	**0.00**	**12.75**
Increase in baseline mortality (%)			**0.23% to 5.33%**	**0.00% to 0.00%**	**0.23% to 5.33%**	**1.07%**	**0.00%**	**1.07%**

1.5.3.37 As the predicted impact on common guillemot from Flannan Isles SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

St Kilda SPA

1.5.3.39 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from St Kilda SPA, an in-combination assessment is presented within Table 1-42 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.42: In-combination assessment for common guillemot from the St Kilda SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0455	0.23 to 5.34	N/A	0.23 to 5.34	1.07	N/A	1.07
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0455	0.12 to 2.86	N/A	0.12 to 2.86	0.57	N/A	0.57
Erebus Floating Wind Demo	No connectivity	0.0455	2.22 to 51.87	N/A	2.22 to 51.87	10.37	N/A	10.37
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0455	0.02 to 0.40	N/A	0.02 to 0.40	0.08	N/A	0.08
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0455	0.15 to 3.53	N/A	0.15 to 3.53	0.71	N/A	0.71
West of Orkney Windfarm	No connectivity	0.0455	0.34 to 7.83	N/A	0.34 to 7.83	1.57	N/A	1.57
White Cross Offshore Windfarm	No connectivity	0.0455	0.08 to 1.94	N/A	0.08 to 1.94	0.39	N/A	0.39
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0455	0.60 to 14.00	N/A	0.60 to 14.00	2.80	N/A	2.80
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0455	0.32 to 7.51	N/A	0.32 to 7.51	1.50	N/A	1.50

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Mona Offshore Wind Project	No connectivity	0.0455	0.29 to 6.88	N/A	0.29 to 6.88	1.38	N/A	1.38
Total predicted impact (adult birds)			**4.38 to 102.14**	**0.00 to 0.00**	**4.38 to 102.14**	**20.43**	**0.00**	**20.43**
Increase in baseline mortality (%)			**0.23% to 5.33%**	**0.00% to 0.00%**	**0.23% to 5.33%**	**1.07%**	**0.00%**	**1.07%**

1.5.3.40 As the predicted impact on common guillemot from St Kilda SPA is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Canna and Sanday SPA

1.5.3.41 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Canna and Sanday, an in-combination assessment is presented within Table 1-43 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.43: In-combination assessment for Common guillemot from the Canna and Sanday SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0113	0.06 to 1.33	N/A	0.06 to 1.33	0.27	N/A	0.27
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0113	0.03 to 0.71	N/A	0.03 to 0.71	0.14	N/A	0.14
Erebus Floating Wind Demo	No connectivity	0.0113	0.55 to 12.88	N/A	0.55 to 12.88	2.58	N/A	2.58
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0113	0.00 to 0.10	N/A	0.00 to 0.10	0.02	N/A	0.02
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0113	0.04 to 0.88	N/A	0.04 to 0.88	0.18	N/A	0.18
West of Orkney Windfarm	No connectivity	0.0113	0.08 to 1.94	N/A	0.08 to 1.94	0.39	N/A	0.39
White Cross Offshore Windfarm	No connectivity	0.0113	0.02 to 0.48	N/A	0.02 to 0.48	0.10	N/A	0.10
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0113	0.15 to 3.48	N/A	0.15 to 3.48	0.70	N/A	0.70
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0113	0.08 to 1.86	N/A	0.08 to 1.86	0.37	N/A	0.37

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Mona Offshore Wind Project	No connectivity	0.0113	0.07 to 1.71	N/A	0.07 to 1.71	0.34	N/A	0.34
Total predicted impact (adult birds)			**1.09 to 25.37**	**0.00 to 0.00**	**1.09 to 25.37**	**5.07**	**0.00**	**5.07**
Increase in baseline mortality (%)			**0.23% to 5.32%**	**0.00% to 0.00%**	**0.23% to 5.32%**	**1.06%**	**0.00%**	**1.06%**

1.5.3.42 As the predicted impact on common guillemot from Canda and Sanday SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Mingulay and Berneray SPA

1.5.3.43 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Mingulay and Berneray SPA an in-combination assessment is presented within Table 1-44 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.44: In-combination assessment for common guillemot from the Mingulay and Berneray SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0392	0.20 to 4.60	N/A	0.20 to 4.60	0.92	N/A	0.92
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0392	0.11 to 2.46	N/A	0.11 to 2.46	0.49	N/A	0.49
Erebus Floating Wind Demo	No connectivity	0.0392	1.92 to 44.69	N/A	1.92 to 44.69	8.94	N/A	8.94
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0392	0.01 to 0.34	N/A	0.01 to 0.34	0.07	N/A	0.07
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0392	0.13 to 3.04	N/A	0.13 to 3.04	0.61	N/A	0.61
West of Orkney Windfarm	No connectivity	0.0392	0.29 to 6.74	N/A	0.29 to 6.74	1.35	N/A	1.35
White Cross Offshore Windfarm	No connectivity	0.0392	0.07 to 1.67	N/A	0.07 to 1.67	0.33	N/A	0.33
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0392	0.52 to 12.06	N/A	0.52 to 12.06	2.41	N/A	2.41
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0392	0.28 to 6.47	N/A	0.28 to 6.47	1.29	N/A	1.29
Mona Offshore Wind Project	No connectivity	0.0392	0.25 to 5.92	N/A	0.25 to 5.92	1.18	N/A	1.18
Total predicted impact (adult birds)			**3.77 to 88.00**	**0.00 to 0.00**	**3.77 to 88.00**	**17.60**	**0.00**	**17.60**

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Increase in baseline mortality (%)			0.23% to 5.33%	0.00% to 0.00%	0.23% to 5.33%	1.07%	0.00%	1.07%

1.5.3.44 As the predicted impact on common guillemot from Mingulay and Berneray SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

North Colonsay and western cliffs SPA

1.5.3.45 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from North Colonsay and western cliffs SPA, an in-combination assessment is presented within Table 1-45 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.45: In-combination assessment for common guillemot from the North Colonsay and Western Cliffs SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0411	0.21 to 4.83	N/A	0.21 to 4.83	0.97	N/A	0.97
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0411	0.11 to 2.58	N/A	0.11 to 2.58	0.52	N/A	0.52
Erebus Floating Wind Demo	No connectivity	0.0411	2.01 to 46.86	N/A	2.01 to 46.86	9.37	N/A	9.37
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0411	0.02 to 0.36	N/A	0.02 to 0.36	0.07	N/A	0.07
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0411	0.14 to 3.19	N/A	0.14 to 3.19	0.64	N/A	0.64
West of Orkney Windfarm	No connectivity	0.0411	0.30 to 7.07	N/A	0.30 to 7.07	1.41	N/A	1.41
White Cross Offshore Windfarm	No connectivity	0.0411	0.08 to 1.75	N/A	0.08 to 1.75	0.35	N/A	0.35
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0411	0.54 to 12.64	N/A	0.54 to 12.64	2.53	N/A	2.53
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0411	0.29 to 6.78	N/A	0.29 to 6.78	1.36	N/A	1.36
Mona Offshore Wind Project	No connectivity	0.0411	0.27 to 6.21	N/A	0.27 to 6.21	1.24	N/A	1.24
Total predicted impact (adult birds)			**3.95 to 92.26**	**0.00 to 0.00**	**3.95 to 92.26**	**18.45**	**0.00**	**18.45**
Increase in baseline mortality (%)			**0.24% to 5.60%**	**0.00% to 0.00%**	**0.24% to 5.60%**	**1.12%**	**0.00%**	**1.12%**

1.5.3.46 As the predicted impact on common guillemot from North Colonsay and Western Cliffs SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Ailsa Craig SPA

1.5.3.47 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Ailsa Craig SPA, an in-combination assessment is presented within Table 1-46 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.46: In-combination assessment for Common guillemot from the Ailsa Craig SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 10% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.016	0.08 to 1.88	N/A	0.08 to 1.88	0.38	N/A	0.38
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.016	0.04 to 1.00	N/A	0.04 to 1.00	0.20	N/A	0.20
Erebus Floating Wind Demo	No connectivity	0.016	0.78 to 18.24	N/A	0.78 to 18.24	3.65	N/A	3.65
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.016	0.01 to 0.14	N/A	0.01 to 0.14	0.03	N/A	0.03
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.016	0.05 to 1.24	N/A	0.05 to 1.24	0.25	N/A	0.25
West of Orkney Windfarm	No connectivity	0.016	0.12 to 2.75	N/A	0.12 to 2.75	0.55	N/A	0.55
White Cross Offshore Windfarm	No connectivity	0.016	0.03 to 0.68	N/A	0.03 to 0.68	0.14	N/A	0.14
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.016	0.21 to 4.92	N/A	0.21 to 4.92	0.98	N/A	0.98
Morgan Offshore Wind Project Generation Assets	No connectivity	0.016	0.11 to 2.64	N/A	0.11 to 2.64	0.53	N/A	0.53

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 10% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Mona Offshore Wind Project	No connectivity	0.016	0.10 to 2.42	N/A	0.10 to 2.42	0.48	N/A	0.48
Total predicted impact (adult birds)			**1.54 to 35.92**	**0.00 to 0.00**	**1.54 to 35.92**	**7.18**	**0.00**	**7.18**
Increase in baseline mortality (%)			**0.24% to 5.61%**	**0.00% to 0.00%**	**0.24% to 5.61%**	**1.12%**	**0.00%**	**1.12%**

1.5.3.48 As the predicted impact on common guillemot from Ailsa Craig SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Rathlin Island SPA

1.5.3.49 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Rathlin Island SPA, an in-combination assessment is presented within Table 1-47 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.47: In-combination assessment for common guillemot from the Rathlin Island SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.2664	1.34 to 31.28	N/A	1.34 to 31.28	6.26	N/A	6.26
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.2664	0.72 to 16.73	N/A	0.72 to 16.73	3.35	N/A	3.35
Erebus Floating Wind Demo	No connectivity	0.2664	13.02 to 303.71	N/A	13.02 to 303.71	60.74	N/A	60.74
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.2664	0.10 to 2.33	N/A	0.10 to 2.33	0.47	N/A	0.47
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.2664	0.89 to 20.65	N/A	0.89 to 20.65	4.13	N/A	4.13
West of Orkney Windfarm	No connectivity	0.2664	1.96 to 45.82	N/A	1.96 to 45.82	9.16	N/A	9.16
White Cross Offshore Windfarm	No connectivity	0.2664	0.49 to 11.35	N/A	0.49 to 11.35	2.27	N/A	2.27
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.2664	3.51 to 81.95	N/A	3.51 to 81.95	16.39	N/A	16.39

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Morgan Offshore Wind Project Generation Assets	No connectivity	0.2664	1.88 to 43.95	N/A	1.88 to 43.95	8.79	N/A	8.79
Mona Offshore Wind Project	No connectivity	0.2664	1.73 to 40.25	N/A	1.73 to 40.25	8.05	N/A	8.05
Total predicted impact (adult birds)			**25.63 to 598.02**	**0.00 to 0.00**	**25.63 to 598.02**	**119.60**	**0.00**	**119.60**
Increase in baseline mortality (%)			**0.24% to 5.61%**	**0.00% to 0.00%**	**0.24% to 5.61%**	**1.12%**	**0.00%**	**1.12%**

1.5.3.50 As the predicted impact on common guillemot from Rathlin Island SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to conclude an if an AEoSI can be ruled out beyond reasonable scientific doubt.

Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA

1.5.3.51 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA, an in-combination assessment is presented within Table 1-48 (30-70% displacement and 1-10% mortality; 70% displacement and 2% mortality).

Table 1.48: In-combination assessment for Common guillemot from the Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA.

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Awel y Môr Offshore Wind Farm	No connectivity	0.0447	0.22 to 5.25	N/A	0.22 to 5.25	1.05	N/A	1.05
Burbo Bank Extension Offshore Wind Farm	No connectivity	0.0447	0.12 to 2.81	N/A	0.12 to 2.81	0.56	N/A	0.56
Erebus Floating Wind Demo	0.754	0.0447	11.29 to 263.32	9.10 to 212.36	2.18 to 50.96	52.66	42.47	10.19
TwinHub (Wave Hub Floating Wind Farm)	No connectivity	0.0447	0.02 to 0.39	N/A	0.02 to 0.39	0.08	N/A	0.08
Walney (3 and 4) Extension Offshore Wind Farm	No connectivity	0.0447	0.15 to 3.47	N/A	0.15 to 3.47	0.69	N/A	0.69
West of Orkney Windfarm	No connectivity	0.0447	0.33 to 7.69	N/A	0.33 to 7.69	1.54	N/A	1.54
White Cross Offshore Windfarm	0.754	0.0447	4.38 to 102.13	4.30 to 100.22	0.08 to 1.90	20.43	20.04	0.38
Morecambe Offshore Windfarm Generation Assets	No connectivity	0.0447	0.59 to 13.75	N/A	0.59 to 13.75	2.75	N/A	2.75
Morgan Offshore Wind Project Generation Assets	No connectivity	0.0447	0.32 to 7.37	N/A	0.32 to 7.37	1.47	N/A	1.47

Project	Apportioning values		Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			Apportioned displacement impact values (70% displacement, 2% mortality)		
	Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual	Breeding	Non-breeding
Mona Offshore Wind Project	No connectivity	0.0447	0.29 to 6.75	N/A	0.29 to 6.75	1.35	N/A	1.35
Total predicted impact (adult birds)			**17.70 to 412.93**	**13.40 to 312.59**	**4.30 to 100.34**	**82.59**	**65.52**	**20.07**
Increase in baseline mortality (%)			**0.89% to 20.76%**	**0.67% to 15.72%**	**0.22% to 5.04%**	**4.15**	**3.14**	**1.01**

1.5.3.52 As the predicted impact on common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6.3) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Great black-backed gull

1.5.3.53 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline great black-backed gull mortality from the Isles of Scilly SPA, an in-combination assessment is presented within Table 1-49.

Table 1.49: In-combination assessment for great black-backed gull from the Isles of Scilly SPA.

Project	Apportioning values	Apportioned collision (species-group avoidance rate 0.9939)
	Non-breeding season	Non-breeding season
Awel y Môr Offshore Wind Farm	0.2885	0.06
Erebus Floating Wind Demo	0.2885	0.07
TwinHub (Wave Hub Floating Wind Farm)	0.2885	1.91
Mona Offshore Wind Project	0.2885	0.64
Morecambe Offshore Windfarm Generation Assets	0.2885	0.04
Morgan Offshore Wind Project Generation Assets	0.2885	0.42
Ormonde Wind Farm	0.2885	0.02
Rampion Offshore Wind Farm	0.2885	2.44
Rampion 2 (Rampion Extension) Offshore Wind Farm	0.2885	1.26
Walney (3 and 4) Extension Offshore Wind Farm	0.2885	2.72
White Cross Offshore Windfarm	0.2885	0.00
Total predicted impact (adult birds)		**9.58**
Increase in baseline mortality (%)		**7.60%**

1.5.3.54 As the predicted impact on great black-backed gull from Isles of Scilly SPA is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.5) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Manx shearwater

1.5.3.55 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in Manx shearwater baseline mortality from Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA, an in-combination assessment is presented within Table 1-50 (30-70% displacement and 1-10% mortality).

Table 1.50: In-combination assessment for Manx shearwater from the Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA.

Plan or project	Apportioning values				Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			
	Pre-breeding	Breeding		Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	0.00326	0.0421	0.00326	0.00 to 0.02	0.00 to 0.04	0.00 to 0.00	0.00 to 0.06	
Burbo Bank Extension Offshore Wind Farm	0.00326	0.0421	0.00326	0.00 to 0.00	0.03 to 0.71	0.00 to 0.00	0.03 to 0.71	
Erebus Floating Wind Demo	0.00326	0.003	0.00326	0.00 to 0.00	0.00 to 0.18	0.00 to 0.07	0.00 to 0.25	
TwinHub (Wave Hub Floating Wind Farm)	0.00326	0.003	0.00326	0.00 to 0.00	0.01 to 0.15	0.00 to 0.00	0.01 to 0.15	
Ormonde Wind Farm	0.00326	0.0863	0.00326	0.00 to 0.00	0.14 to 3.29	0.00 to 0.00	0.14 to 3.29	
Mona Offshore Wind Project	0.00326	0.1134	0.00326	0.00 to 0.00	0.23 to 5.39	0.00 to 0.02	0.23 to 5.41	
Morecambe Offshore Windfarm Generation Assets	0.00326	0.0863	0.00326	0.00 to 0.00	1.07 to 24.88	0.00 to 0.00	1.07 to 24.88	
Morgan Offshore Wind Project Generation Assets	0.00326	0.085	0.00326	0.00 to 0.01	0.06 to 1.51	0.00 to 0.06	0.07 to 1.58	
Rampion Offshore Wind Farm	0.00326	No connectivity	0.00326	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00	
Rampion 2 Offshore Wind Farm	0.00326	No connectivity	0.00326	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00	
Walney (3 and 4) Extension Offshore Wind Farm	0.00326	0.0863	0.00326	0.00 to 0.00	0.08 to 1.93	0.00 to 0.04	0.08 to 1.97	
West of Duddon Sands Offshore Wind Farm	0.00326	0.0863	0.00326	0.00 to 0.00	0.08 to 1.79	0.00 to 0.00	0.08 to 1.79	
West of Orkney Windfarm	0.00326	No connectivity	0.00326	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00	

Plan or project	Apportioning values				Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			
	Pre-breeding	Breeding		Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
White Cross Offshore Windfarm	0.00326	0.0028	0.00326	0.06 to 1.50	0.00 to 0.00	0.00 to 0.00	0.06 to 1.51	
Total predicted impact (adult birds)				**0.07 to 1.54**	**1.70 to 39.86**	**0.01 to 0.19**	**1.77 to 41.59**	
Increase in baseline mortality (%)				**0.00% to 0.04%**	**0.04% to 0.95%**	**0.00% to 0.00%**	**0.04% to 0.99%**	

1.5.3.56 As the predicted impact on Manx shearwater from Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Copeland Islands SPA

1.5.3.57 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in Manx shearwater baseline mortality from Copeland Islands SPA, an in-combination assessment is presented within Table 1-51 (30-70% displacement and 1-10% mortality).

Table 1.51: In-combination assessment for Manx shearwater from the Copeland Island SPA.

Plan or project	Apportioning values				Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			
	Pre-breeding	Breeding		Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	0.001	0.0059	0.001	0.00 to 0.01	0.00 to 0.01	0.00 to 0.00	0.00 to 0.01	
Burbo Bank Extension Offshore Wind Farm	0.001	0.0059	0.001	0.00 to 0.00	0.00 to 0.10	0.00 to 0.00	0.00 to 0.10	
Erebus Floating Wind Demo	0.001	0.0028	0.001	0.00 to 0.00	0.00 to 0.16	0.00 to 0.02	0.00 to 0.19	
TwinHub (Wave Hub Floating Wind Farm)	0.001	0.0028	0.001	0.00 to 0.00	0.01 to 0.14	0.00 to 0.00	0.01 to 0.14	
Ormonde Wind Farm	0.001	0.0222	0.001	0.00 to 0.00	0.04 to 0.85	0.00 to 0.00	0.04 to 0.85	
Mona Offshore Wind Project	0.001	0.022	0.001	0.00 to 0.00	0.04 to 1.05	0.00 to 0.01	0.05 to 1.05	
Morecambe Offshore Windfarm Generation Assets	0.001	0.0222	0.001	0.00 to 0.00	0.27 to 6.40	0.00 to 0.00	0.27 to 6.40	
Morgan Offshore Wind Project Generation Assets	0.001	0.035	0.001	0.00 to 0.00	0.03 to 0.62	0.00 to 0.02	0.03 to 0.64	
Rampion Offshore Wind Farm	0.001	No connectivity	0.001	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00	
Rampion 2 Offshore Wind Farm	0.001	No connectivity	0.001	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00	
Walney (3 and 4) Extension Offshore Wind Farm	0.001	0.0222	0.001	0.00 to 0.00	0.03 to 0.77	0.00 to 0.00	0.03 to 0.77	
West of Duddon Sands Offshore Wind Farm	0.001	0.0222	0.001	0.00 to 0.00	0.02 to 0.46	0.00 to 0.00	0.02 to 0.46	

Plan or project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
West of Orkney Windfarm	0.001	No connectivity	0.001	0.00 to 0.00	N/A	0.00 to 0.00	0.00 to 0.00
White Cross Offshore Windfarm	0.001	0.0002	0.001	0.02 to 0.46	0.00 to 0.00	0.00 to 0.00	0.02 to 0.46
Total predicted impact (adult birds)			**0.02 to 0.47**	**0.45 to 10.55**	**0.00 to 0.05**	**0.47 to 11.07**	
Increase in baseline mortality (%)			**0.00% to 0.04%**	**0.04% to 0.84%**	**0.00% to 0.00%**	**0.04% to 0.88%**	

1.5.3.58 As the predicted impact on Manx shearwater from Copeland Island SPA is <1% increase in baseline mortality, therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects, the impact is not considered to hinder the conservation objects of the site and, therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.5.3.59 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in Manx shearwater baseline mortality from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, an in-combination assessment is presented within Table 1-52 (30-70% displacement and 1-10% mortality).

Table 1.52: In-combination assessment for Manx shearwater from the Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA.

Plan or project	Apportioning values				Apportioned displacement impact values (30-70% displacement 1-10% mortality)			
	Pre-breeding	Breeding		Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	0.7054	0.4436	0.7054	0.20 to 4.75	0.02 to 0.44	0.00 to 0.00	0.22 to 5.19	
Burbo Bank Extension Offshore Wind Farm	0.7054	0.4436	0.7054	0.00 to 0.00	0.32 to 7.49	0.00 to 0.00	0.32 to 7.49	
Erebus Floating Wind Demo	0.7054	0.995	0.7054	2.21 to 0.48	0.40 to 58.29	1.35 to 14.95	3.96 to 73.72	
TwinHub (Wave Hub Floating Wind Farm)	0.7054	0.995	0.7054	0.00 to 0.00	2.07 to 48.19	0.00 to 0.00	2.07 to 48.19	
Ormonde Wind Farm	0.7054	0.752	0.7054	0.00 to 0.00	1.25 to 29.18	0.00 to 0.00	1.25 to 29.18	
Mona Offshore Wind Project	0.7054	0.7497	0.7054	0.00 to 0.08	1.53 to 35.62	0.21 to 4.88	1.74 to 40.59	
Morecambe Offshore Windfarm Generation Assets	0.7054	0.7654	0.7054	0.00 to 0.00	9.46 to 220.63	0.01 to 0.16	9.46 to 220.79	
Morgan Offshore Wind Project Generation Assets	0.7054	0.752	0.7054	0.07 to 1.58	0.57 to 13.36	0.54 to 12.53	1.18 to 27.48	
Rampion Offshore Wind Farm	0.7054	No connectivity	0.7054	0.00 to 0.00	N/A to N/A	0.00 to 0.00	0.00 to 0.00	
Rampion 2 Offshore Wind Farm	0.7054	No connectivity	0.7054	0.00 to 0.00	N/A to N/A	0.00 to 0.00	0.00 to 0.00	
Walney (3 and 4) Extension Offshore Wind Farm	0.7054	0.7654	0.7054	0.00 to 0.00	1.14 to 26.56	0.00 to 0.00	1.14 to 26.56	
West of Duddon Sands Offshore Wind Farm	0.7054	0.7654	0.7054	0.00 to 0.00	0.68 to 15.96	0.00 to 0.00	0.68 to 15.96	

Plan or project	Apportioning values				Apportioned displacement impact values (30-70% displacement 1-10% mortality)			
	Pre-breeding	Breeding		Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
West of Orkney Windfarm	0.7054	No connectivity	0.7054	0.00 to 0.00	0.00 to 0.00	0.00 to 0.08	0.00 to 0.08	
White Cross Offshore Windfarm	0.7054	0.6032	0.7054	13.95 to 325.41	0.03 to 0.76	0.03 to 0.59	14.00 to 326.76	
Total predicted impact (adult birds)				**16.43 to 332.31**	**17.47 to 456.47**	**2.14 to 33.20**	**36.03 to 821.98**	
Increase in baseline mortality (%)				**1.30% to 0.28%**	**1.39% to 0.39%**	**0.17% to 0.03%**	**2.86% to 0.69%**	

1.5.3.60 As the predicted impact on Manx shearwater from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA is <1% increase in baseline mortality, which is likely to be undetectable against natural variation, the impact is not considered to hinder the conservation objects of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects.

Northern gannet

Ailsa Craig SPA

1.5.3.61 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in northern gannet baseline mortality from Alisa Craig SPA, an in-combination assessment is presented within Table 1-53 (80% displacement and 10% mortality and species-group avoidance rate).

Table 1.53: In-combination assessment for northern gannet from the Ailsa Craig SPA.

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.1386	0.4620	0.1706	0.00 to 0.00	0.50 to 6.70	0.11 to 1.52	0.00	2.78	0.24	0.00	9.47	1.75
Burbo Bank Extension Offshore Wind Farm	0.1386	0.4620	0.1706	0.01 to 0.15	0.99 to 13.23	0.01 to 0.17	0.00	3.17	0.00	0.15	16.41	0.17

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Erebus Floating Wind Demo	0.1386	No connectivity	0.1706	0.05 to 0.61	N/A	0.19 to 2.52	0.05	N/A	0.06	0.66	N/A	2.58
TwinHub (Wave Hub Floating Wind Farm)	0.1386	No connectivity	0.1706	0.00 to 0.00	N/A	0.09 to 1.15	0.00	N/A	0.00	0.00	N/A	1.15
Ormonde Wind Farm	0.1386	0.5078	0.1706	0.00 to 0.00	0.33 to 4.47	0.00 to 0.00	0.00	1.89	0.00	0.00	6.35	0.00
Mona Offshore Wind Project	0.1386	0.5620	0.1706	0.01 to 0.17	0.47 to 6.23	0.03 to 0.44	0.03	1.47	0.05	0.20	7.70	0.49
Morecambe Offshore Windfarm Generation Assets	0.1386	0.5078	0.1706	0.00 to 0.00	1.26 to 16.79	0.09 to 1.24	0.00	0.02	0.00	0.00	16.81	1.24
Morgan Offshore Wind Project Generation Assets	0.1386	0.5680	0.1706	0.02 to 0.32	0.39 to 5.25	0.11 to 1.45	0.02	0.53	0.02	0.34	5.77	1.47
Walney (3 and 4) Extension Offshore Wind Farm	0.1386	0.5078	0.1706	0.01 to 0.15	0.25 to 3.37	0.15 to 1.95	0.07	4.57	1.56	0.22	7.94	3.51
West of Duddon Sands Offshore Wind Farm	0.1386	0.5078	0.1706	0.00 to 0.00	0.73 to 9.67	0.00 to 0.00	0.00	0.00	0.00	0.00	9.67	0.00
West of Orkney Windfarm	0.1386	0.0003	0.1706	0.03 to 0.36	0.00 to 0.01	0.66 to 8.83	0.16	0.01	1.22	0.52	0.02	10.05
White Cross Offshore Windfarm	0.1386	0.0112	0.1706	0.06 to 0.86	0.01 to 0.12	0.04 to 0.57	0.00	0.03	0.16	0.86	0.15	0.73
Total predicted impact (adult birds)				**0.20 to 2.63**	**4.94 to 65.84**	**1.49 to 19.83**	**0.33**	**14.46**	**3.31**	**0.52 to 2.96**	**19.40 to 80.30**	**4.79 to 23.14**
Increase in baseline mortality (%)				**0.00% to 0.05%**	**0.09% to 1.22%**	**0.03% to 0.37%**	**0.01%**	**0.27%**	**0.06%**	**0.01% to 0.05%**	**0.36% to 1.49%**	**0.09% to 0.43%**
Annual impact and increase in baseline mortality from the combined impact (when considering 60-80% displacement and 1-10% mortality)										**24.72 to 106.40 birds** **0.46% to 1.98% increase in baseline mortality**		

1.5.3.62 As the predicted impact on northern gannet from Ailsa Craig SPA is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.4) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Grassholm SPA

1.5.3.63 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in northern gannet baseline mortality from Grassholm SPA, an in-combination assessment is presented within Table 1-54 (60-80% displacement and 1-10% mortality and species-group avoidance rate).

Table 1.54: In-combination assessment for northern gannet from the Grassholm SPA.

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 110% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.2007	0.3670	0.2471	0.00 to 0.00	0.40 to 5.32	0.16 to 2.20	0.00	2.21	0.35	0.00 to 0.00	2.60 to 7.53	0.51 to 2.54
Burbo Bank Extension Offshore Wind Farm	0.2007	0.3670	0.2471	0.02 to 0.22	0.79 to 10.51	0.02 to 0.24	0.00	2.52	0.00	0.02 to 0.22	3.31 to 13.03	0.02 to 0.24
Erebus Floating Wind Demo	0.2007	0.9950	0.2471	0.07 to 0.89	0.74 to 9.85	0.27 to 3.65	0.07	1.85	0.08	0.13 to 0.95	2.59 to 11.70	0.36 to 3.73
TwinHub (Wave Hub Floating Wind Farm)	0.2007	0.9950	0.2471	0.00 to 0.00	0.80 to 10.73	0.13 to 1.67	0.00	14.39	0.00	0.00 to 0.00	15.20 to 25.12	0.13 to 1.67
Ormonde Wind Farm	0.2007	0.3141	0.2471	0.00 to 0.00	0.21 to 2.76	0.00 to 0.00	0.00	1.17	0.00	0.00 to 0.00	1.37 to 3.93	0.00 to 0.00
Mona Offshore Wind Project	0.2007	0.1760	0.2471	0.02 to 0.25	0.15 to 1.95	0.05 to 0.63	0.05	0.46	0.07	0.06 to 0.29	0.61 to 2.41	0.12 to 0.70
Morecambe Offshore Windfarm Generation Assets	0.2007	0.3141	0.2471	0.00 to 0.00	0.78 to 10.38	0.13 to 1.79	0.00	0.01	0.00	0.00 to 0.00	0.79 to 10.40	0.13 to 1.79
Morgan Offshore Wind Project Generation Assets	0.2007	0.2580	0.2471	0.04 to 0.47	0.18 to 2.38	0.16 to 2.10	0.02	0.24	0.03	0.06 to 0.49	0.42 to 2.62	0.19 to 2.13
Walney (3 and 4) Extension Offshore Wind Farm	0.2007	0.3141	0.2471	0.02 to 0.21	0.16 to 2.08	0.21 to 2.83	0.10	2.83	2.26	0.12 to 0.31	2.98 to 4.91	2.47 to 5.09
West of Duddon Sands Offshore Wind Farm	0.2007	0.3141	0.2471	0.00 to 0.00	0.45 to 5.98	0.00 to 0.00	0.00	0.00	0.00	0.00 to 0.00	0.45 to 5.98	0.00 to 0.00
West of Orkney Windfarm	0.2007	No connectivity	0.2471	0.04 to 0.52	N/A	0.96 to 12.79	0.23	N/A	1.76	0.27 to 0.76	N/A	2.72 to 14.55
White Cross Offshore Windfarm	0.2007	0.5208	0.2471	0.09 to 1.25	0.41 to 5.50	0.06 to 0.83	0.00	1.27	0.23	0.09 to 1.25	1.68 to 6.77	0.29 to 1.06
Total predicted impact (adult birds)				**0.29 to 3.81**	**5.06 to 67.46**	**2.15 to 28.72**	**0.47**	**26.95**	**4.79**	**0.76 to 4.29**	**32.01 to 94.42**	**6.94 to 33.51**

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 110% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Increase in baseline mortality (%)				**0.00% to 0.07%**	**0.09% to 1.16%**	**0.04% to 0.49%**	**0.01%**	**0.46%**	**0.08%**	**0.01% to 0.07%**	**0.55% to 1.62%**	**0.12% to 0.57%**
Annual impact and increase in baseline mortality from the combined impact (when considering 60-80% displacement and 1-10% mortality)										**39.71 to 132.22 birds** **0.68% to 2.27% increase in baseline mortality**		

1.5.3.64 As the predicted impact on northern gannet from Grasholm SPA is predicted to be >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.4) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Saltee Islands SPA

1.5.3.65 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in northern gannet baseline mortality from Saltee Islands SPA, an in-combination assessment is presented within Table 1-55 (60-80% displacement and 1-10% mortality and species-group avoidance rate).

Table 1.55: In-combination assessment for northern gannet from the Saltee Islands SPA.

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement, 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0015	0.0210	0.0015	0.00 to 0.00	0.02 to 0.30	0.00 to 0.01	0.00	0.13	0.00	0.00 to 0.00	0.15 to 0.43	0.00 to 0.02
Burbo Bank Extension Offshore Wind Farm	0.0015	0.0210	0.0015	0.00 to 0.00	0.05 to 0.60	0.00 to 0.00	0.00	0.14	0.00	0.00 to 0.00	0.19 to 0.75	0.00 to 0.00
Erebus Floating Wind Demo	0.0015	0.0030	0.0015	0.00 to 0.01	0.00 to 0.03	0.00 to 0.02	0.00	0.01	0.00	0.00 to 0.01	0.01 to 0.04	0.00 to 0.02
TwinHub (Wave Hub Floating Wind Farm)	0.0015	0.0030	0.0015	0.00 to 0.00	0.00 to 0.03	0.00 to 0.01	0.00	0.04	0.00	0.00 to 0.00	0.05 to 0.08	0.00 to 0.01

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement, 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Ormonde Wind Farm	0.0015	0.0377	0.0015	0.00 to 0.00	0.02 to 0.33	0.00 to 0.00	0.00	0.14	0.00	0.00 to 0.00	0.16 to 0.47	0.00 to 0.00
Mona Offshore Wind Project	0.0015	0.0280	0.0015	0.00 to 0.00	0.02 to 0.31	0.00 to 0.00	0.00	0.07	0.00	0.00 to 0.00	0.10 to 0.38	0.00 to 0.00
Morecambe Offshore Windfarm Generation Assets	0.0015	0.0377	0.0015	0.00 to 0.00	0.09 to 1.25	0.00 to 0.01	0.00	0.00	0.00	0.00 to 0.00	0.10 to 1.25	0.00 to 0.01
Morgan Offshore Wind Project Generation Assets	0.0015	0.0320	0.0015	0.00 to 0.00	0.02 to 0.30	0.00 to 0.01	0.00	0.03	0.00	0.00 to 0.00	0.05 to 0.33	0.00 to 0.01
Walney (3 and 4) Extension Offshore Wind Farm	0.0015	0.0377	0.0015	0.00 to 0.00	0.02 to 0.25	0.00 to 0.02	0.00	0.34	0.01	0.00 to 0.00	0.36 to 0.59	0.02 to 0.03
West of Duddon Sands Offshore Wind Farm	0.0015	0.0377	0.0015	0.00 to 0.00	0.05 to 0.72	0.00 to 0.00	0.00	0.00	0.00	0.00 to 0.00	0.05 to 0.72	0.00 to 0.00
West of Orkney Windfarm	0.0015	No connectivity	0.0015	0.00 to 0.00	N/A	0.01 to 0.08	0.00	N/A	0.01	0.00 to 0.01	N/A	0.02 to 0.09
White Cross Offshore Windfarm	0.0015	0.0141	0.0015	0.00 to 0.01	0.01 to 0.15	0.00 to 0.01	0.00	0.03	0.00	0.00 to 0.01	0.05 to 0.18	0.00 to 0.01
Total predicted impact (adult birds)				**0.00 to 0.03**	**0.32 to 4.27**	**0.01 to 0.17**	**0.00**	**0.94**	**0.03**	**0.01 to 0.03**	**1.26 to 5.21**	**0.04 to 0.20**
Increase in baseline mortality (%)				**0.00% to 0.00%**	**0.04% to 0.56%**	**0.00% to 0.02%**	**0.00%**	**0.12%**	**0.00%**	**0.00% to 0.00%**	**0.16% to 0.68%**	**0.01% to 0.03%**
Annual impact and increase in baseline mortality from the combined impact (when considering 60-80% displacement and 1-10% mortality)										**1.31 to 5.44 birds** **0.17% to 0.71% increase in baseline mortality**		

1.5.3.66 As the predicted impact on northern gannet from Saltee Islands SPA <1% increase in baseline mortality, which is likely to be undetectable against natural variation the impact is not considered to hinder the conservation objectives of the site, and therefore, it is concluded beyond reasonable scientific doubt that there would be no AEoSI from the Mona Offshore Wind Project in-combination with other plans and projects..

Skelligs SPA

1.5.3.67 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in northern gannet baseline mortality from Skelligs SPA, an in-combination assessment is presented within Table 1-56 (80% displacement and 10% mortality and species-group avoidance rate).

Table 1.56: In-combination assessment for northern gannet from the Skelligs SPA.

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.048	0.0437	0.040	0.00 to 0.00	0.05 to 0.63	0.03 to 0.35	0.00	0.26	0.06	0.00 to 0.00	0.31 to 0.90	0.08 to 0.41
Burbo Bank Extension Offshore Wind Farm	0.048	0.0437	0.040	0.00 to 0.05	0.09 to 1.25	0.00 to 0.04	0.00	0.30	0.00	0.00 to 0.05	0.39 to 1.55	0.00 to 0.04
Erebus Floating Wind Demo	0.048	0.002	0.040	0.02 to 0.21	0.00 to 0.02	0.04 to 0.59	0.02	0.00	0.01	0.03 to 0.23	0.01 to 0.02	0.06 to 0.60
TwinHub (Wave Hub Floating Wind Farm)	0.048	0.002	0.040	0.00 to 0.00	0.00 to 0.02	0.02 to 0.27	0.00	0.03	0.00	0.00 to 0.00	0.03 to 0.05	0.02 to 0.27
Ormonde Wind Farm	0.048	0.0437	0.040	0.00 to 0.00	0.03 to 0.38	0.00 to 0.00	0.00	0.16	0.00	0.00 to 0.00	0.19 to 0.55	0.00 to 0.00
Mona Offshore Wind Project	0.048	0.0437	0.040	0.00 to 0.06	0.04 to 0.48	0.01 to 0.10	0.01	0.11	0.01	0.02 to 0.07	0.15 to 0.60	0.02 to 0.11
Morecambe Offshore Windfarm Generation Assets	0.048	0.0437	0.040	0.00 to 0.00	0.11 to 1.44	0.02 to 0.29	0.00	0.00	0.00	0.00 to 0.00	0.11 to 1.45	0.02 to 0.29
Morgan Offshore Wind Project Generation Assets	0.048	0.0437	0.040	0.01 to 0.11	0.03 to 0.40	0.03 to 0.34	0.01	0.04	0.01	0.01 to 0.12	0.07 to 0.44	0.03 to 0.34
Walney (3 and 4) Extension Offshore Wind Farm	0.048	0.0437	0.040	0.00 to 0.05	0.02 to 0.29	0.03 to 0.46	0.02	0.39	0.36	0.03 to 0.08	0.42 to 0.68	0.40 to 0.82
West of Duddon Sands Offshore Wind Farm	0.048	0.0437	0.040	0.00 to 0.00	0.06 to 0.83	0.00 to 0.00	0.00	0.00	0.00	0.00 to 0.00	0.06 to 0.83	0.00 to 0.00
West of Orkney Windfarm	0.048	No connectivity	0.040	0.01 to 0.13	N/A	0.15 to 2.06	0.06	N/A	0.28	0.07 to 0.18	N/A	0.44 to 2.34
White Cross Offshore Windfarm	0.048	0.002	0.040	0.02 to 0.30	0.00 to 0.02	0.01 to 0.13	0.00	0.00	0.00	0.02 to 0.30	0.00 to 0.02	0.01 to 0.13
Total predicted impact (adult birds)				**0.07 to 0.92**	**0.43 to 5.79**	**0.35 to 4.63**	**0.11**	**1.31**	**0.73**	**0.18 to 1.04**	**1.74 to 7.10**	**1.08 to 5.36**

Project	Apportioning values			Apportioned displacement impact values (60-80% displacement and 1-10% mortality)			Apportioned collision (species-group avoidance rate 0.9928)			Combined impact		
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Increase in baseline mortality (%)				**0.01% to 0.12%**	**0.06% to 0.76%**	**0.05% to 0.60%**	**0.01%**	**0.17%**	**0.10%**	**0.02% to 0.14%**	**0.23% to 0.93%**	**0.14% to 0.70%**
Annual impact and increase in baseline mortality from the combined impact (when considering 60-80% displacement and 1-10% mortality)										**3.01 to 13.49 birds** **0.39 to 1.76% increase in baseline mortality**		

1.5.3.68 As the predicted impact on northern gannet from Skelligs SPA is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6.4) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Razorbill

Cape Wrath SPA

1.5.3.69 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Cape Wrath SPA, an in-combination assessment is presented within Table 1-57 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.57: In-combination assessment for razorbill from the Cape Wrath SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0129	0.0129	0.0093	0.01 to 0.17	0.00 to 0.03	0.00 to 0.06	0.09	0.04	0.01
Erebus Floating Wind Demo	0.0129	0.0129	0.0093	0.02 to 0.46	0.00 to 0.88	0.03 to 0.40	0.23	0.05	0.32
TwinHub (Wave Hub Floating Wind Farm)	0.0129	0.0129	0.0093	0.00 to 0.00	0.00 to 0.00	0.00 to 0.02	0.00	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0129	0.0129	0.0093	0.00 to 0.00	0.00 to 0.45	0.01 to 1.14	0.00	0.02	0.16
West of Duddon Sands Offshore Wind Farm	0.0129	0.0129	0.0093	0.00 to 0.00	0.00 to 0.00	0.00 to 0.08	0.00	0.00	0.00
West of Orkney Windfarm	0.0129	0.0129	0.0093	0.00 to 0.05	0.00 to 0.07	0.00 to 0.01	0.02	0.02	0.03
White Cross Offshore Windfarm	0.0129	0.0129	0.0093	0.01 to 0.18	0.00 to 0.02	0.00 to 0.13	0.09	0.01	0.01
Morecambe Offshore Windfarm Generation Assets	0.0129	0.0129	0.0093	0.01 to 0.20	0.00 to 0.35	0.01 to 0.22	0.10	0.06	0.12
Morgan Offshore Wind Project Generation Assets	0.0129	0.0129	0.0093	0.00 to 0.09	0.00 to 0.05	0.00 to 0.09	0.04	0.03	0.02
Mona Offshore Wind Project	0.0129	0.0129	0.0093	0.04 to 0.99	0.00 to 0.05	0.00 to 0.16	0.49	0.02	0.02
Total predicted impact (adult birds)				**0.09 to 2.14**	**0.02 to 1.91**	**0.06 to 2.29**	**1.06**	**0.24**	**0.68**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Increase in baseline mortality (%)				0.02% to 0.49%	0.00% to 0.43%	0.01% to 0.52%	0.10%	0.02%	0.06%
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				0.17 to 6.35 birds 0.04% to 1.45% increase in baseline mortality		1.99 birds 0.18% increase in baseline mortality			

1.5.3.70 As the predicted impact on razorbill from Cape Wrath SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality) the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Handa SPA

1.5.3.71 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Handa SPA, an in-combination assessment is presented within Table 1-58 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.58: In-combination assessment for razorbill from the Handa SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0319	0.0319	0.0231	0.02 to 0.43	0.01 to 0.08	0.00 to 0.14	0.09	0.04	0.01
Erebus Floating Wind Demo	0.0319	0.0319	0.0231	0.05 to 1.14	0.01 to 2.18	0.07 to 0.99	0.23	0.05	0.32
TwinHub (Wave Hub Floating Wind Farm)	0.0319	0.0319	0.0231	0.00 to 0.00	0.00 to 0.00	0.00 to 0.05	0.00	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0319	0.0319	0.0231	0.00 to 0.00	0.00 to 1.12	0.03 to 2.83	0.00	0.02	0.16
West of Duddon Sands Offshore Wind Farm	0.0319	0.0319	0.0231	0.00 to 0.00	0.00 to 0.00	0.00 to 0.19	0.00	0.00	0.00
West of Orkney Windfarm	0.0319	0.0319	0.0231	0.01 to 0.12	0.00 to 0.18	0.01 to 0.01	0.02	0.02	0.03
White Cross Offshore Windfarm	0.0319	0.0319	0.0231	0.02 to 0.44	0.00 to 0.05	0.00 to 0.33	0.09	0.01	0.01
Morecambe Offshore Windfarm Generation Assets	0.0319	0.0319	0.0231	0.02 to 0.50	0.01 to 0.86	0.03 to 0.55	0.10	0.06	0.12
Morgan Offshore Wind Project Generation Assets	0.0319	0.0319	0.0231	0.01 to 0.21	0.01 to 0.13	0.00 to 0.22	0.04	0.03	0.02
Mona Offshore Wind Project	0.0319	0.0319	0.0231	0.11 to 2.46	0.00 to 0.12	0.00 to 0.39	0.49	0.02	0.02
Total predicted impact (adult birds)				**0.23 to 5.30**	**0.05 to 4.72**	**0.15 to 5.70**	**1.06**	**0.24**	**0.68**
Increase in baseline mortality (%)				**0.05% to 0.49%**	**0.01% to 0.44%**	**0.03% to 0.53%**	**0.10%**	**0.02%**	**0.06%**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**0.43 to 15.72 birds 0.04% to 1.45% increase in baseline mortality**		**1.99 birds 0.18% increase in baseline mortality**			

1.5.3.72 As the predicted impact on razorbill from Cape Wrath SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality) the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Shiant Isles SPA

1.5.3.73 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Shiant Isles SPA, an in-combination assessment is presented within Table 1-59 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.59: In-combination assessment for razorbill from the Shiant Isles SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0263	0.0263	0.019	0.02 to 0.35	0.01 to 0.07	0.00 to 0.11	0.07	0.03	0.01
Erebus Floating Wind Demo	0.0263	0.0263	0.019	0.04 to 0.94	0.01 to 1.80	0.06 to 0.81	0.19	0.04	0.26
TwinHub (Wave Hub Floating Wind Farm)	0.0263	0.0263	0.019	0.00 to 0.00	0.00 to 0.00	0.00 to 0.04	0.00	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0263	0.0263	0.019	0.00 to 0.00	0.00 to 0.92	0.03 to 2.33	0.00	0.02	0.13
West of Duddon Sands Offshore Wind Farm	0.0263	0.0263	0.019	0.00 to 0.00	0.00 to 0.00	0.00 to 0.15	0.00	0.00	0.00
West of Orkney Windfarm	0.0263	0.0263	0.019	0.00 to 0.10	0.00 to 0.15	0.00 to 0.01	0.02	0.01	0.02
White Cross Offshore Windfarm	0.0263	0.0263	0.019	0.02 to 0.36	0.00 to 0.04	0.00 to 0.27	0.07	0.01	0.01
Morecambe Offshore Windfarm Generation Assets	0.0263	0.0263	0.019	0.02 to 0.41	0.01 to 0.71	0.02 to 0.45	0.08	0.05	0.10
Morgan Offshore Wind Project Generation Assets	0.0263	0.0263	0.019	0.01 to 0.17	0.01 to 0.11	0.00 to 0.18	0.03	0.03	0.02
Mona Offshore Wind Project	0.0263	0.0263	0.019	0.09 to 2.02	0.00 to 0.10	0.00 to 0.32	0.40	0.02	0.01
Total predicted impact (adult birds)				**0.19 to 4.37**	**0.04 to 3.89**	**0.12 to 4.69**	**0.87**	**0.20**	**0.56**
Increase in baseline mortality (%)				**0.04% to 0.49%**	**0.01% to 0.44%**	**0.03% to 0.53%**	**0.10%**	**0.02%**	**0.06%**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**0.35 to 12.95 birds 0.04 % to 1.45% increase in baseline mortality**		**1.64 birds 0.18% increase in baseline mortality**			

1.5.3.74 As the predicted impact on razorbill from Shiant Isles SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality) the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Flannan Isles SPA

1.5.3.75 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Flanna Isles SPA, an in-combination assessment is presented within Table 1-60 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.60: In-combination assessment for razorbill from the Flannan Isles SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0065	0.0065	0.0047	0.00 to 0.09	0.00 to 0.02	0.00 to 0.03	0.02	0.01	0.00
Erebus Floating Wind Demo	0.0065	0.0065	0.0047	0.01 to 0.23	0.00 to 0.44	0.01 to 0.20	0.05	0.01	0.06
TwinHub (Wave Hub Floating Wind Farm)	0.0065	0.0065	0.0047	0.00 to 0.00	0.00 to 0.00	0.00 to 0.01	0.00	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0065	0.0065	0.0047	0.00 to 0.00	0.00 to 0.23	0.01 to 0.58	0.00	0.00	0.03
West of Duddon Sands Offshore Wind Farm	0.0065	0.0065	0.0047	0.00 to 0.00	0.00 to 0.00	0.00 to 0.04	0.00	0.00	0.00
West of Orkney Windfarm	0.0065	0.0065	0.0047	0.00 to 0.03	0.00 to 0.04	0.00 to 0.00	0.01	0.00	0.01
White Cross Offshore Windfarm	0.0065	0.0065	0.0047	0.00 to 0.09	0.00 to 0.01	0.00 to 0.07	0.02	0.00	0.00
Morecambe Offshore Windfarm Generation Assets	0.0065	0.0065	0.0047	0.00 to 0.10	0.00 to 0.18	0.01 to 0.11	0.02	0.01	0.03
Morgan Offshore Wind Project Generation Assets	0.0065	0.0065	0.0047	0.00 to 0.04	0.00 to 0.03	0.00 to 0.04	0.01	0.01	0.00
Mona Offshore Wind Project	0.0065	0.0065	0.0047	0.02 to 0.50	0.00 to 0.02	0.00 to 0.08	0.10	0.00	0.00
Total predicted impact (adult birds)				**0.05 to 1.08**	**0.01 to 0.96**	**0.03 to 1.16**	**0.22**	**0.05**	**0.14**
Increase in baseline mortality (%)				**0.02% to 0.49%**	**0.00% to 0.44%**	**0.01% to 0.53%**	**0.10%**	**0.02%**	**0.06%**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**0.09 to 3.20 birds 0.04% to 1.45% increase in baseline mortality**		**0.40 birds 0.18% increase in baseline mortality**			

1.5.3.76 As the predicted impact on razorbill from Flannan Isles SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality), the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Mingulay and Berneray SPA

1.5.3.77 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Mingulay and Berneray SPA, an in-combination assessment is presented within Table 1-61 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.61: In-combination assessment for razorbill from the Mingulay and Berneray SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0625	0.0625	0.0451	0.04 to 0.84	0.02 to 0.17	0.01 to 0.27	0.17	0.07	0.02
Erebus Floating Wind Demo	0.0625	0.0625	0.0451	0.10 to 2.24	0.02 to 4.27	0.13 to 1.93	0.45	0.10	0.62
TwinHub (Wave Hub Floating Wind Farm)	0.0625	0.0625	0.0451	0.00 to 0.00	0.00 to 0.00	0.00 to 0.10	0.00	0.01	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0625	0.0625	0.0451	0.00 to 0.00	0.01 to 2.19	0.07 to 5.53	0.00	0.04	0.32
West of Duddon Sands Offshore Wind Farm	0.0625	0.0625	0.0451	0.00 to 0.00	0.00 to 0.00	0.00 to 0.36	0.00	0.00	0.00
West of Orkney Windfarm	0.0625	0.0625	0.0451	0.01 to 0.24	0.01 to 0.36	0.01 to 0.03	0.05	0.04	0.05
White Cross Offshore Windfarm	0.0625	0.0625	0.0451	0.04 to 0.86	0.00 to 0.10	0.00 to 0.65	0.17	0.02	0.01
Morecambe Offshore Windfarm Generation Assets	0.0625	0.0625	0.0451	0.04 to 0.97	0.02 to 1.69	0.05 to 1.08	0.19	0.11	0.24
Morgan Offshore Wind Project Generation Assets	0.0625	0.0625	0.0451	0.02 to 0.42	0.01 to 0.26	0.01 to 0.42	0.08	0.06	0.04
Mona Offshore Wind Project	0.0625	0.0625	0.0451	0.21 to 4.81	0.01 to 0.23	0.01 to 0.76	0.96	0.04	0.03
Total predicted impact (adult birds)				**0.44 to 10.38**	**0.10 to 9.25**	**0.29 to 11.12**	**2.08**	**0.48**	**1.33**
Increase in baseline mortality (%)				**0.02% to 0.49%**	**0.00% to 0.44%**	**0.01% to 0.52%**	**0.10%**	**0.02%**	**0.06%**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**0.83 to 30.76 birds 0.04% to 1.45% increase in baseline mortality**		**3.89 birds 0.18% increase in baseline mortality**			

1.5.3.78 As the predicted impact on razorbill from Mingulay and Berneray SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality), the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

Rathlin Island SPA

1.5.3.79 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Rathlin Island SPA, an in-combination assessment is presented within Table 1-62 (30-70% displacement and 1-10% mortality and 70% displacement and 2% mortality).

Table 1.62: In-combination assessment for razorbill from the Rathlin Island SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0952	0.0952	0.0687	0.05 to 1.28	0.02 to 0.25	0.01 to 0.41	0.26	0.11	0.04
Erebus Floating Wind Demo	0.0952	0.0952	0.0687	0.15 to 3.41	0.03 to 6.50	0.20 to 2.94	0.68	0.15	0.94
TwinHub (Wave Hub Floating Wind Farm)	0.0952	0.0952	0.0687	0.00 to 0.00	0.00 to 0.00	0.00 to 0.15	0.00	0.01	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0952	0.0952	0.0687	0.00 to 0.00	0.01 to 3.33	0.10 to 8.43	0.00	0.06	0.48
West of Duddon Sands Offshore Wind Farm	0.0952	0.0952	0.0687	0.00 to 0.00	0.00 to 0.00	0.00 to 0.56	0.00	0.00	0.00
West of Orkney Windfarm	0.0952	0.0952	0.0687	0.02 to 0.37	0.01 to 0.55	0.02 to 0.04	0.07	0.05	0.08
White Cross Offshore Windfarm	0.0952	0.0952	0.0687	0.06 to 1.31	0.01 to 0.15	0.00 to 0.99	0.26	0.03	0.02
Morecambe Offshore Windfarm Generation Assets	0.0952	0.0952	0.0687	0.06 to 1.48	0.04 to 2.57	0.08 to 1.64	0.30	0.17	0.37
Morgan Offshore Wind Project Generation Assets	0.0952	0.0952	0.0687	0.03 to 0.63	0.02 to 0.39	0.01 to 0.64	0.13	0.09	0.06
Mona Offshore Wind Project	0.0952	0.0952	0.0687	0.31 to 7.33	0.01 to 0.35	0.01 to 1.16	1.47	0.06	0.05
Total predicted impact (adult birds)				**0.68 to 15.81**	**0.16 to 14.09**	**0.44 to 16.94**	**3.16**	**0.73**	**2.03**
Increase in baseline mortality (%)				**0.02% to 0.49%**	**0.00% to 0.44%**	**0.01% to 0.52%**	**0.10%**	**0.02%**	**0.06%**

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 2% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**1.27 to 46.85 birds 0.04% to 1.45% increase in baseline mortality**		**5.93 birds 0.18% increase in baseline mortality**			

1.5.3.80 As the predicted impact on razorbill from Rathlin Island SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality) the impact is further investigated by a PVA (see section 1.6.6) to determined whether AEoSI can be ruled out beyond reasonable scientific doubt.

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.5.3.81 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in razorbill baseline mortality from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, an in-combination assessment is presented within Table 1-63 (70% displacement and 10% mortality and 70% displacement and 2% mortality).

Table 1.63: In-combination assessment for razorbill from the Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA.

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 10% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
Awel y Môr Offshore Wind Farm	0.0371	0.0371	0.0201	0.02 to 0.50	0.01 to 0.10	0.00 to 0.12	0.10	0.04	0.01
Erebus Floating Wind Demo	0.0371	0.0371	0.0201	0.06 to 1.33	0.01 to 2.53	0.06 to 0.86	0.27	0.06	0.27
TwinHub (Wave Hub Floating Wind Farm)	0.0371	0.0371	0.0201	0.00 to 0.00	0.00 to 0.00	0.00 to 0.04	0.00	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	0.0371	0.0371	0.0201	0.00 to 0.00	0.00 to 1.30	0.03 to 2.47	0.00	0.02	0.14

Project	Apportioning values			Apportioned displacement impact values (30-70% displacement and 1-10% mortality)		Apportioned displacement impact values (70% displacement, 10% mortality)			
	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Non-breeding
West of Duddon Sands Offshore Wind Farm	0.0371	0.0371	0.0201	0.00 to 0.00	0.00 to 0.00	0.00 to 0.16	0.00	0.00	0.00
West of Orkney Windfarm	0.0371	0.0371	0.0201	0.01 to 0.14	0.00 to 0.21	0.00 to 0.01	0.03	0.02	0.02
White Cross Offshore Windfarm	0.0371	0.0371	0.0201	0.02 to 0.51	0.00 to 0.06	0.00 to 0.29	0.10	0.01	0.01
Morecambe Offshore Windfarm Generation Assets	0.0371	0.0371	0.0201	0.02 to 0.58	0.01 to 1.00	0.02 to 0.48	0.12	0.07	0.11
Morgan Offshore Wind Project Generation Assets	0.0371	0.0371	0.0201	0.01 to 0.25	0.01 to 0.15	0.00 to 0.19	0.05	0.04	0.02
Mona Offshore Wind Project	0.0371	0.0371	0.0201	0.12 to 2.86	0.01 to 0.14	0.00 to 0.34	0.57	0.02	0.01
Total predicted impact (adult birds)				**0.26 to 6.16**	**0.06 to 5.49**	**0.13 to 4.96**	**1.23**	**0.28**	**0.59**
Increase in baseline mortality (%)				**0.01% to 0.49%**	**0.00% to 0.44%**	**0.00% to 0.39%**	**0.10%**	**0.02%**	**0.06%**
Annual impact and increase in baseline mortality from displacement (when considering 70% displacement and 10% mortality)				**0.45 to 16.61 birds** **0.04% to 1.32% increase in baseline mortality**		**2.11 birds** **0.17% increase in baseline mortality**			

1.5.3.82 As the predicted impact on razorbill from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA is >1% increase in baseline mortality (when considering 70% displacement and 10% mortality) the impact is further investigated by a PVA (see section 1.6.6) to determine whether AEoSI can be ruled out beyond reasonable scientific doubt.

1.6 Population Viability Analysis

1.6.1.1 Given the considerations set out in section 1.1.2, the Applicant would note that the scenarios set out in this section are highly conservative, should not be interpreted in isolation and do not represent a realistic scenario. The Applicant maintains the conclusions presented in the HRA Stage 2 ISAA Part Three: SPAs and Ramsar sites Assessments (REP2-010) are accurate, although this document presents the full range of assessment scenarios as requested by the SNCBs.

1.6.1.2 Table 1-64 provides a summary of those sites and species where the increase in baseline mortality from in-combination impacts was found to exceed 1% when considering the upper displacement and mortality range recommended by the SNCBs (Table 1.2).

1.6.1.3 A PVA has been undertaken for each SPA and species which exceeds a >1% increase in baseline mortality for the upper displacement and mortality threshold impact for common guillemot, razorbill, northern gannet and greater black-backed gull. PVAs have also been undertaken for the alternative approach for common guillemot (using 70% displacement rate and 2% mortality rate) when predicted impacts would result in an increase in baseline mortality of >1%. PVAs for black-legged kittiwake have been undertaken when using an alternative approach (using 30% displacement and 3% mortality rate) when predicted impacts would result in an increase in baseline mortality of >1%. The results of the PVAs are presented in section 1.6

Table 1.64: Summary of colony sites where apportioned in-combination impacts result in an increase in baseline mortality of >1%.

Species	Bio seas on	Impact	Site	Adult bird mortalities (worst-case)	Increase in baseline mortality(worst-case)	Estimated mortalities when using alternative approach[1]	Percentage increase in baseline mortalities using alternative approach
Common guillemot	Non-bree ding	Displaceme nt	Sule Skerry and Sule Stack SPA	228.45	24.54	45.69	4.91%
			North Rona and Sula Sgeir SPA	32.59	5.34	6.52	1.07%
			Cape Wrath SPA	182.64	5.47	36.53	1.09%
			Handa SPA	249.20	5.38	49.84	1.08%
			Shiant Isles SPA	33.49	5.33	6.70	1.07%
			Flannan Isles SPA	63.75	5.33	12.75	1.07%
			St Kilda SPA	102.14	5.33	20.43	1.07%
			Canna and Sanday SPA	25.37	5.32	5.07	1.06%
			Mingulay and Berneray SPA	88.00	5.33	17.60	1.07%
			North Colonsay and Western Cliffs SPA	92.26	5.60	18.45	1.12%
			Ailsa Craig SPA	35.92	5.61	7.18	1.12%
			Rathlin Island SPA	598.02	5.61	119.60	1.12%

Species	Bio season	Impact	Site	Adult bird mortalities (worst-case)	Increase in baseline mortality(worst-case)	Estimated mortalities when using alternative approach[1]	Percentage increase in baseline mortalities using alternative approach
			Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	412.93	20.76	82.59	4.15%
Razorbill	Non-Breeding	Displacement	Cape Wrath SPA	6.35	1.45	0.80	0.18%
			Handa SPA	15.72	1.45	1.99	0.18%
			Shiant Isles SPA	12.95	1.45	1.64	0.18%
			Mingulay and Berneray	30.76	1.45	3.89	0.18%
			Rathlin Island	46.85	1.45	5.93	0.18%
			Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	16.61	1.32	2.11	0.17%
			Flannan Isles SPA	3.20	1.45	0.40	0.18%
Black-legged kittiwake	Annual	Displacement and collisions	Ailsa Craig SPA	2.03	1.42%	0.63	0.44%
			Lambay Island SPA	14.27	1.47%	4.01	0.41%
			Ireland's Eye SPA	5.50	1.21	1.47	0.33%
			Howth Head Coast SPA	11.74	2.24%	3.17	0.61%
			Wicklow Head SPA	6.84	3.48%	2.26	1.15%
			Skomer, Skokholm and the Seas eshire/Sgomer, Sgogwm a Moroedd Penfro SPA	72.65	24.71%	15.38	5.23%
Nothern gannet	Annual	Displacement and collisions	Ailsa Craig SPA	106.40	1.98%	N/A	
			Grassholm SPA	132.22	2.27%		
			Skelligs SPA	13.49	1.76%		
Glack-backed gull	Non-breeding	Collision	Isles of Scilly SPA	9.58	7.60%	N/A	

[1] The 'alternative approach' considered for common guillemot, razorbill and black-legged kittiwake using accepted displacement and mortality rates as recently accepted and used by the Secretary of State within the HRAs for Hornsea Two/Three/Four, East Anglia One North, East Anglia Two, Norfolk Boreas, Norfolk Vanguard, Sheringham Shoal and Dudgeon Extension Projects (SEP and DEP). The rates presented for common guillemot and razorbill are 70% displacement and 2% mortality (see paragraph 1.2.1.7). The rates used for black-legged kittiwake are 30% displacement and 3% mortality (see paragraph 1.2.1.9).

1.6.2 Black-legged kittiwake

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.6.2.1 One scenario was modelled within the PVA for black-legged kittiwake from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, considering the scenario of 30% displacement and 3% mortality, in line with the NatureScot guidance (NatureScot, 2023). A PVA was not undertaken for the worst-case scenario due to lack of empirical evidence.

1.6.2.2 For the scenario using a 30% displacement rate and 3% mortality rate, the predicted impact would result in the median growth rate continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-65). The counterfactual of the growth rate also indicates the impact scenarios are near to the baseline or the non-impacted predicted growth rate.

Table 1.65: PVA outputs for black-legged kittiwake from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	2,265	11.08%	1.0131	0.8411	1.2211	-	-
2030	Impact	2,244	10.25%	1.0038	0.8363	1.2084	0.9913	0.9910
2065	Baseline	3,704	45.63%	1.0142	0.9936	1.0342	-	-
2065	Impact	2,676	24.74%	1.0050	0.9847	1.0249	0.7221	0.9910

1.6.2.3 As the results of the PVA undertaken for black-legged kittiwake from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Wicklow Head SPA

1.6.2.4 One scenario was modelled within the PVA for black-legged kittiwake from Wicklow Head SPA, considering the scenario of 30% displacement and 3% mortality, in line with the NatureScot guidance (NatureScot, 2023). A PVA was not undertaken for the worst-case scenario due to lack of empirical evidence.

1.6.2.5 For the scenario, the predicted impact would result in the median growth rate continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-66). The counterfactual of the

growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.66: PVA outputs for black-legged kittiwake from Wicklow Head SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	1,671	23.96%	1.0165	0.8454	1.2143	-	-
2030	Impact	1,669	23.81%	1.0144	0.8418	1.2108	0.9978	0.9981
2065	Baseline	2,746	103.71%	1.0143	0.9940	1.0343	-	-
2065	Impact	2,565	90.24%	1.0122	0.9918	1.0322	0.9312	0.9980

1.6.2.6 As the results of the PVA undertaken for black-legged kittiwake from Wicklow Head SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

1.6.3 Common guillemot

Ailsa Craig SPA

1.6.3.1 Two scenarios were modelled within the PVA for common guillemot from Ailsa Craig SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.2 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-67). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.67: PVA outputs for common guillemot from Ailsa Craig SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	15,946	51.95%	1.0255	1.0199	1.0312	-	-
2030	70 and 2	15,936	51.86%	1.0247	1.0190	1.0304	0.9991	0.9993

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	70 and 10	15,887	51.39%	1.0217	1.0159	1.0277	0.9963	0.9963
2065	Baseline	38,549	267.34%	1.0255	1.0250	1.0261	-	-
2065	70 and 2	37,491	257.26%	1.0247	1.0242	1.0253	0.9726	0.9992
2065	70 and 10	33,579	219.98%	1.0216	1.0211	1.0222	0.8711	0.9962

1.6.3.3 As the results of the two PVAs undertaken for common guillemot from Ailsa Craig SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Canna and Sanday SPA

1.6.3.4 Two scenarios were modelled within the PVA for common guillemot from Canna and Sanday SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.5 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-68). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.68: PVA outputs for common guillemot from Canna and Sanday SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1999	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	16,930	116.33%	1.0255	1.0201	1.0309	-	-
2030	70 and 2	16,914	116.13%	1.0249	1.0193	1.0303	0.9991	0.9994
2030	70 and 10	16,867	115.53%	1.0220	1.0166	1.0276	0.9961	0.9966
2065	Baseline	40,910	422.74%	1.0255	1.0250	1.0261	-	-
2065	70 and 2	39,861	409.34%	1.0248	1.0243	1.0253	0.9741	0.9993

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1999	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2065	70 and 10	35,918	358.95%	1.0218	1.0213	1.0224	0.8778	0.9964

1.6.3.6 As the results of the two PVAs undertaken for common guillemot from Canna and Sanday SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Cape Wrath SPA

1.6.3.7 Two scenarios were modelled within the PVA for common guillemot from Cape Wrath SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.8 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-69). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.69: PVA outputs for common guillemot from Cape Wrath SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2000	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	115,402	110.90%	1.0256	1.0234	1.0276	-	-
2030	70 and 2	115,329	110.77%	1.0248	1.0227	1.0269	0.9993	0.9993
2030	70 and 10	114,994	110.16%	1.0219	1.0197	1.0240	0.9963	0.9964
2065	Baseline	278,879	409.67%	1.0255	1.0253	1.0257	-	-
2065	70 and 2	271,531	396.24%	1.0248	1.0246	1.0250	0.9734	0.9993
2065	70 and 10	243,882	345.71%	1.0217	1.0215	1.0219	0.8744	0.9963

1.6.3.9 As the results of the two PVAs undertaken for common guillemot from Cape Wrath SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Flannan Isles SPA

1.6.3.10 Two scenarios were modelled within the PVA for common guillemot from Flanna Isles SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.11 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-70). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.70: PVA outputs for common guillemot from Flannan Isles SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1999	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	42,430	116.33%	1.0255	1.0221	1.0290	-	-
2030	70 and 2	42,405	116.20%	1.0248	1.0213	1.0284	0.9993	0.9993
2030	70 and 10	42,286	115.59%	1.0220	1.0184	1.0255	0.9964	0.9966
2065	Baseline	102,526	422.72%	1.0255	1.0252	1.0259	-	-
2065	70 and 2	99,901	409.33%	1.0248	1.0244	1.0251	0.9742	0.9993
2065	70 and 10	89,955	358.63%	1.0218	1.0215	1.0222	0.8774	0.9964

1.6.3.12 As the results of the two PVAs undertaken for common guillemot from Flannan Isles SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Handa SPA

1.6.3.13 Two scenarios were modelled within the PVA for common guillemot from Handa SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.14 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-71). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.71: PVA outputs for common guillemot from Handa SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2011	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	121,445	59.83%	1.0255	1.0235	1.0276	-	-
2030	70 and 2	121,370	59.73%	1.0248	1.0227	1.0269	0.9993	0.9993
2030	70 and 10	121,023	59.27%	1.0220	1.0199	1.0241	0.9966	0.9965
2065	Baseline	293,492	286.24%	1.0255	1.0253	1.0257	-	-
2065	70 and 2	285,845	276.18%	1.0248	1.0246	1.0250	0.9739	0.9993
2065	70 and 10	257,230	238.52%	1.0218	1.0216	1.0220	0.8765	0.9963

1.6.3.15 As the results of the two PVAs undertaken for common guillemot from Handa SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Mingulay and Berneray SPA

1.6.3.16 Two scenarios were modelled within the PVA for common guillemot from Mingulay and Berneray SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.17 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-72). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.72: PVA outputs for common guillemot from Mingulay and Berneray SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2009	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	45,483	68.12%	1.0255	1.0221	1.0289	-	-
2030	70 and 2	45,441	67.96%	1.0249	1.0214	1.0282	0.9993	0.9993
2030	70 and 10	45,318	67.51%	1.0220	1.0184	1.0254	0.9966	0.9965
2065	Baseline	109,888	306.18%	1.0255	1.0252	1.0259	-	-
2065	70 and 2	107,053	295.70%	1.0248	1.0245	1.0251	0.9741	0.9993
2065	70 and 10	96,427	256.42%	1.0218	1.0215	1.0221	0.8774	0.9964

1.6.3.18 As the results of the two PVAs undertaken for common guillemot from Mingulay and Berneray SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

North Colonsay and Western Cliffs SPA

1.6.3.19 Two scenarios were modelled within the PVA for common guillemot from North Colonsay and Western Cliffs SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.20 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-73). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.73: PVA outputs for common guillemot from North Colonsay and Western Cliffs SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2000	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	56,950	110.93%	1.0255	1.0225	1.0287	-	-
2030	70 and 2	56,898	110.73%	1.0248	1.0217	1.0278	0.9989	0.9993

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2000	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	70 and 10	56,736	110.13%	1.0218	1.0187	1.0249	0.9960	0.9964
2065	Baseline	137,647	409.80%	1.0255	1.0252	1.0258	-	-
2065	70 and 2	133,916	395.98%	1.0248	1.0245	1.0250	0.9727	0.9992
2065	70 and 10	119,934	344.20%	1.0216	1.0213	1.0219	0.8714	0.9962

1.6.3.21 As the results of the two PVAs undertaken for common guillemot from North Colonsay and Western Cliffs SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

North Rona and Sula Sgeir SPA

1.6.3.22 Two scenarios were modelled within the PVA for common guillemot from North Rona and Sula Sgeir SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.23 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-74). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.74: PVA outputs for common guillemot from North Rona and Sula Sgeir SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2012	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	15,588	55.88%	1.0254	1.0199	1.0311	-	-
2030	70 and 2	15,573	55.73%	1.0248	1.0189	1.0304	0.9993	0.9994
2030	70 and 10	15,529	55.29%	1.0219	1.0162	1.0279	0.9964	0.9965
2065	Baseline	37,671	276.71%	1.0255	1.0250	1.0261	-	-
2065	70 and 2	36,680	266.80%	1.0248	1.0242	1.0253	0.9739	0.9993

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2012	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2065	70 and 10	33,026	230.26%	1.0218	1.0212	1.0224	0.8770	0.9964

1.6.3.24 As the results of the two PVAs undertaken for common guillemot from North Rona and Sula Sgeir SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Rathlin Island SPA

1.6.3.25 Two scenarios were modelled within the PVA for common guillemot from Rathlin Island SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.26 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-75). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.75: PVA outputs for common guillemot from Rathlin Island SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2011	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	279,377	59.83%	1.0255	1.0242	1.0269	-	-
2030	70 and 2	279,185	59.72%	1.0248	1.0234	1.0262	0.9993	0.9993
2030	70 and 10	278,364	59.25%	1.0218	1.0204	1.0232	0.9964	0.9963
2065	Baseline	675,186	286.27%	1.0255	1.0254	1.0257	-	-
2065	70 and 2	656,858	275.79%	1.0247	1.0246	1.0249	0.9728	0.9992
2065	70 and 10	588,342	236.59%	1.0216	1.0215	1.0218	0.8715	0.9962

1.6.3.27 As the results of the two PVAs undertaken for common guillemot from Rathlin Island SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Shiant Isles SPA

1.6.3.28 Two scenarios were modelled within the PVA for common guillemot from Shiant Isles SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.29 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-76). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.76: PVA outputs for common guillemot from Shiant Isles SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2008	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	17,749	72.39%	1.0255	1.0202	1.0308	-	-
2030	70 and 2	17,739	72.29%	1.0248	1.0194	1.0303	0.9993	0.9993
2030	70 and 10	17,690	71.81%	1.0220	1.0165	1.0275	0.9965	0.9965
2065	Baseline	42,903	316.69%	1.0255	1.0250	1.0260	-	-
2065	70 and 2	41,794	305.92%	1.0248	1.0243	1.0253	0.9741	0.9993
2065	70 and 10	37,653	265.71%	1.0218	1.0213	1.0223	0.8776	0.9964

1.6.3.30 As the results of the two PVAs undertaken for common guillemot from Shiant Isles SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.6.3.31 Two scenarios were modelled within the PVA for common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.32 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-77). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate when considering the 70% displacement and 2% mortality.

Table 1.77: PVA outputs for common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	49,548	51.99%	1.0256	1.0222	1.0287	-	-
2030	70 and 2	49,413	51.57%	1.0228	1.0194	1.0260	0.9972	0.9973
2030	70 and 10	48,876	49.93%	1.0117	1.0083	1.0150	0.9864	0.9865
2065	Baseline	119,751	267.33%	1.0255	1.0252	1.0258	-	-
2065	70 and 2	108,122	231.66%	1.0226	1.0223	1.0229	0.9030	0.9972
2065	70 and 10	71,737	120.05%	1.0110	1.0107	1.0114	0.5992	0.9859

1.6.3.33 As the results of the two PVAs undertaken for common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

St Kilda SPA

1.6.3.34 Two scenarios were modelled within the PVA for common guillemot from St Kilda SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.35 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-78). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.78: PVA outputs for common guillemot from St Kilda SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1999	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	67,928	116.33%	1.0255	1.0229	1.0283	-	-
2030	70 and 2	67,866	116.13%	1.0248	1.0220	1.0275	0.9991	0.9993
2030	70 and 10	67,673	115.52%	1.0219	1.0192	1.0248	0.9963	0.9965
2065	Baseline	164,167	422.82%	1.0255	1.0253	1.0258	-	-
2065	70 and 2	159,888	409.20%	1.0248	1.0245	1.0251	0.9743	0.9993
2065	70 and 10	143,976	358.52%	1.0218	1.0215	1.0221	0.8773	0.9964

1.6.3.36 As the results of the two PVAs undertaken for common guillemot from St Kilda SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Sule Skerry and Sule Stack SPA

1.6.3.37 Two scenarios were modelled within the PVA for common guillemot from Sule Skerry and Sule Stack SPA, one considering the worst-case scenario of 70% displacement and 10% mortality and one considering an alternative approach considering 70% displacement and 2% mortality.

1.6.3.38 For both scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-78). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate when considering the 70% displacement and 2% mortality.

Table 1.79: PVA outputs for common guillemot from Sule Skerry and Sule Stack SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1998	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	33,864	121.83%	1.0255	1.0217	1.0294	-	-
2030	70 and 2	33,761	121.15%	1.0223	1.0184	1.0261	0.9969	0.9968
2030	70 and 10	33,326	118.30%	1.0091	1.0052	1.0132	0.9842	0.9841
2065	Baseline	81,839	436.09%	1.0255	1.0252	1.0259	-	-
2065	70 and 2	72,560	375.30%	1.0221	1.0217	1.0225	0.8866	0.9967
2065	70 and 10	44,652	192.49%	1.0084	1.0080	1.0089	0.5456	0.9833

1.6.3.39 As the results of the two PVAs undertaken for common guillemot from Sule Skerry and Sule Stack SPA indicating an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

1.6.4 Northern gannet

Ailsa Craig SPA

1.6.4.1 One scenario was modelled within the PVA for northern gannet from Ailsa Craig SPA, considering the worst-case scenario of 80% displacement and 10% mortality and collisions when using the species-group avoidance rate.

1.6.4.2 The PVA resulted in a predicted impact which indicates that median growth rate (and 95% confidence intervals) continue to be >1 and therefore indicate that the population is predicted to increase in size under these modelled parameters (Table 1-80). The counterfactual of the growth rate also indicates the impact scenario is close to the baseline or the non-impacted predicted growth rate.

Table 1.80: PVA outputs for northern gannet from Ailsa Craig SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2014	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	78,787	18.56%	1.0110	1.0082	1.0137	-	-
2030	Impact	78,645	18.35%	1.0092	1.0065	1.0120	0.9983	0.9983

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2014	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2065	Baseline	115,428	73.70%	1.0110	1.0107	1.0113	-	-
2065	Impact	107,897	62.37%	1.0091	1.0088	1.0094	0.9345	0.9981

1.6.4.3 As the results of the PVA undertaken for northern gannet from Ailsa Craig SPA indicate an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Grassholm SPA

1.6.4.4 One scenario was modelled within the PVA for northern gannet from Grassholm SPA, considering the worst-case scenario of 80% displacement and 10% mortality and collisions when using the species-group avoidance rate.

1.6.4.5 The PVA resulted in a predicted impact which indicates that median growth rate (and 95% confidence intervals) continue to be >1 and therefore indicate that the population is predicted to increase in size under these modelled parameters (Table 1-81). The counterfactual of the growth rate also indicates the impact scenario is close to the baseline or the non-impacted predicted growth rate.

Table 1.81: PVA outputs for northern gannet from Grassholm SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2014	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	85,391	18.56%	1.0110	1.0084	1.0136	-	-
2030	Impact	85,227	18.33%	1.0089	1.0063	1.0116	0.9981	0.9980
2065	Baseline	125,131	73.74%	1.0110	1.0107	1.0113	-	-
2065	Impact	115,757	60.72%	1.0088	1.0085	1.0091	0.9251	0.9978

1.6.4.6 As the results of the PVA undertaken for northern gannet from Grassholm SPA indicate an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives

for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Skelligs SPA

1.6.4.7 One scenario was modelled within the PVA for northern gannet from Skelligs SPA, considering the worst-case scenario of 80% displacement and 10% mortality and collisions when using the species-group avoidance rate.

1.6.4.8 The PVA resulted in a predicted impact which indicates that median growth rate (and 95% confidence intervals) continue to be >1 and therefore indicate that the population is predicted to increase in size under these modelled parameters (Table 1-82). The counterfactual of the growth rate also indicates the impact scenario is close to the baseline or the non-impacted predicted growth rate.

Table 1.82: PVA outputs for northern gannet from Skelligs SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2014	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	83,685	18.55%	1.0110	1.0083	1.0137	-	-
2030	Impact	83,685	18.55%	1.0107	1.0082	1.0134	0.9988	0.9988
2065	Baseline	122,633	73.73%	1.0110	1.0107	1.0113	-	-
2065	Impact	121,659	72.35%	1.0107	1.0104	1.0111	0.9920	0.9998

1.6.4.9 As the results of the PVA undertaken for northern gannet from Skelligs SPA indicate an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

1.6.5 Great black-backed gull

Isles of Scilly SPA

1.6.5.1 One scenario was modelled within the PVA for great black-backed gull from Isles of Scilly SPA, considering the worst-case scenario of collisions when using the species-group avoidance rate.

1.6.5.2 The PVA resulted in a predicted impact which indicates that median growth rate (and 95% confidence intervals) continue to be >1 and therefore indicate that the population is predicted to increase in size under these modelled parameters (Table 1-83).

Table 1.83: PVA outputs for great black-backed gull from Isles of Scilly SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2014	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	29,769	1,552%	1.1266	1.1206	1.1325	-	-
2030	Impact	29,599	1,543%	1.1202	1.1141	1.1263	0.9940	0.9944
2065	Baseline	1,929,801	106,992%	1.1266	1.1263	1.1269	-	-
2065	Impact	1,565,177	86,758%	1.1201	1.1198	1.1203	0.8105	0.9942

1.6.5.3 As the results of the PVA undertaken for great black-backed gull from Isles of Scilly SPA indicate an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

1.6.6 Razorbill

Cape Wrath SPA

1.6.6.1 One scenario was modelled within the PVA for razorbill from Cape Wrath SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.2 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-84). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.84: PVA outputs for razorbill from Cape Wrath SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2000	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	5,674	35.74%	1.0105	0.9988	1.0221	-	-
2030	Impact	5,657	35.33%	1.0087	0.9974	1.0200	0.9971	0.9981
2065	Baseline	8,135	94.62%	1.0104	1.0092	1.0115	-	-
2065	Impact	7,640	82.78%	1.0086	1.0074	1.0098	0.9395	0.9983

1.6.6.3 As the results of the PVA undertaken for razorbill from Cape Wrath SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Flannan Isles SPA

1.6.6.4 One scenario was modelled within the PVA for razorbill from Flannan Isles SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.5 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-85). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.85: PVA outputs for razorbill from Flannan Isles SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 1999	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	2,913	38.58%	1.0103	0.9946	1.0267	-	-
2030	Impact	2,906	38.25%	1.0089	0.9931	1.0242	0.9976	0.9984
2065	Baseline	4,182	98.93%	1.0104	1.0087	1.0120	-	-
2065	Impact	3,920	86.49%	1.0086	1.0069	1.0103	0.9369	0.9982

1.6.6.6 As the results of the PVA undertaken for razorbill from Flannan Isles SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Handa SPA

1.6.6.7 One scenario was modelled within the PVA for razorbill from Handa SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2%

mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.8 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-86). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.86: PVA outputs for razorbill from Handa SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2010	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	12,648	22.44%	1.0104	1.0028	1.0178	-	-
2030	Impact	12,625	22.22%	1.0087	1.0006	1.0162	0.9986	0.9982
2065	Baseline	18,145	75.65%	1.0104	1.0096	1.0112	-	-
2065	Impact	17,042	64.98%	1.0086	1.0078	1.0094	0.9388	0.9983

1.6.6.9 As the results of the PVA undertaken for razorbill from Handa SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Mingulay and Berneray SPA

1.6.6.10 One scenario was modelled within the PVA for razorbill from Mingulay and Berneray SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.11 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-87). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.87: PVA outputs for razorbill from Mingulay and Berneray SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2009	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	25,009	23.67%	1.0104	1.0049	1.0159	-	-
2030	Impact	24,963	23.44%	1.0087	1.0032	1.0141	0.9979	0.9983
2065	Baseline	35,884	77.45%	1.0104	1.0098	1.0109	-	-
2065	Impact	33,711	66.70%	1.0086	1.0080	1.0092	0.9395	0.9983

1.6.6.12 As the results of the PVA undertaken for razorbill from Mingulay and Berneray SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Rathlin Island SPA

1.6.6.13 One scenario was modelled within the PVA for razorbill from Rathlin Island SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.14 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-88). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.88: PVA outputs for razorbill from Rathlin Island SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2011	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	37,299	21.16%	1.0104	1.0060	1.0148	-	-
2030	Impact	37,244	20.98%	1.0087	1.0043	1.0132	0.9985	0.9983
2065	Baseline	53,498	73.77%	1.0104	1.0099	1.0108	-	-
2065	Impact	50,268	63.28%	1.0086	1.0081	1.0091	0.9399	0.9983

1.6.6.15 As the results of the PVA undertaken for razorbill from Rathlin Island SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Shiant Isles SPA

1.6.6.16 One scenario was modelled within the PVA for razorbill from Shiant Isles SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.17 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-89). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.89: PVA outputs for razorbill from Shiant Isles SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2008	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	10,617	24.96%	1.0104	1.0024	1.0186	-	-
2030	Impact	10,598	24.74%	1.0086	1.0003	1.0169	0.9979	0.9982
2065	Baseline	15,232	79.28%	1.0104	1.0095	1.0113	-	-
2065	Impact	14,311	68.44%	1.0086	1.0077	1.0095	0.9396	0.9982

1.6.6.18 As the results of the PVA undertaken for razorbill from Shiant Isles SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

1.6.6.19 One scenario was modelled within the PVA for razorbill from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA, considering the worst-case scenario of 70% displacement and 10% mortality. A PVA was not

undertaken for the alternative approach (considering 70% displacement and 2% mortality) due to the impact predicted being <1% increase in baseline mortality and therefore not requiring a PVA (Parker *et al.*, 2023).

1.6.6.20 For the scenario, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters (Table 1-90). The counterfactual of the growth rate also indicates the impact scenarios are close to the baseline or the non-impacted predicted growth rate.

Table 1.90: PVA outputs for razorbill from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

Year	Impact scenario	Simulated median adult population size	Percentage population change since 2013	Median growth rate	2.5 percentile of simulated growth rate	97.5 percentile of simulated growth rate	Median counterfactual of population size	Median counterfactual of growth rate
2030	Baseline	14,242	18.66%	1.0102	1.0031	1.0175	-	-
2030	Impact	14,219	18.47%	1.0088	1.0013	1.0163	0.9986	0.9985
2065	Baseline	20,431	70.23%	1.0104	1.0096	1.0111	-	-
2065	Impact	19,302	60.82%	1.0088	1.0080	1.0095	0.9450	0.9984

1.6.6.21 As the results of the PVA undertaken for razorbill from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA indicated an increasing population size with and without the predicted impacts it can be concluded that there is no AEoSI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects. On coming to this conclusion the Applicant has had consideration of the sites conservation objectives (Appendix to ExQ1 Q1.10.6 Part B Conservation objectives for SPAs screened in for Likely Significant Effects S_D3_25.6). This conclusion replicates what was previously presented in HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010).

1.7 Conclusions

1.7.1.1 Following the submission of the Mona Offshore Wind Project application, the SNCBs requested additional clarification on the impacts presented within the EIA (specifically collisions) and HRA (specifically presenting a range of impacts). This supporting information technical note has been produced to provide the clarity that the SNCBs requested.

1.7.1.2 Within the EIA documentation the mean collision impacts were assessed, however the SNCBs requested that the LCI and UCI were also included within the assessment presented in the EIA and HRA. Within section 1.4 the impacts are assessed including the mean, LCI and UCI. When considering the worst-case scenario (UCI) the impact on all species (apart from great back-backed gull) resulted in >1% increase in baseline mortality and no change to the impact magnitude was predicted. For great black-backed gull a PVA was required as the UCI (and mean) impact were predicted to increase the baseline mortality by >1% (when considering the smallest foraging range breeding season population). The PVA predicted no change in the conclusions of the

assessment, with the population predicted to increase in size when considering both the mean and UCI impacts.

1.7.1.3 When presenting the range of displacement impacts for each species and apportioning the impact to relevant SPAs, several SPAs required an in-combination assessment. The in-combination assessments (section 1.5.3) resulted in several SPAs requiring PVAs as the impacts predicted resulted in an increase in baseline mortality of >1%. The PVAs presented in section 1.6 predicted that for each SPA and species considered there would be no decrease in population size under any of the impact scenarios. The range-based scenarios were presented for common guillemot, northern gannet, great black-backed gull and razorbill as requested by the SNCBs. Common guillemot was also modelled within the PVAs, considering an alternative approach using the 70% displacement and 2% mortality. Black-legged kittiwake was not assessed against the worst-case scenario (i.e. 70% displacement and 10% mortality) and a more pragmatic 30% displacement and 3% mortality was modelled within the PVAs.

1.7.1.4 Following the PVAs, no AEoSI was predicted for each SPA and species and therefore the conclusions presented within HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (REP2-010) remain valid.

1.8 References

NatureScot (2018). Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs. Available at: https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations

Appendix A: PVA modelling sheets

Great black backed gull UCI Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 20:37:24 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GB_ForagingRange_UCI”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Great Black-Backed Gull.
Region type to use for breeding success data: Global.
Available colony-specific survival rate: National. Sector to use within breeding success region: Global.
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 3 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: all.individuals
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 1496 in 2022

Productivity rate per pair: mean: 1.139 , sd: 1e-04

Adult survival rate: mean: 0.93 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.798 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.93 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 2.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Mean

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.00111631 , se: NA

Scenario B - Name: UCI

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002326203 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: whole.population
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Great black backed gulls Isle of Scilly Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 11:26:19 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GBBG_IoS2”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Great Black-Backed Gull.
Region type to use for breeding success data: Reg.Seas.
Available colony-specific survival rate: National. Sector to use within breeding success region: Irish Sea.
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 3 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 1802 in 2006

Productivity rate per pair: mean: 1.011012 , sd: 0.4724585

Adult survival rate: mean: 0.93 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.798 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.93 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.93 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.005316315 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Ailsa Craig Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 14:05:51 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_AilsaCraig”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10494 in 2013

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003422908 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Canna Sanday Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:49:50 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_Canna&Sanday”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 7826 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003241758 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Cape Wrath Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:26:00 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_CapeWrath”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 54718 in 2000

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003337841 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Flannan Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:43:56 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_Flannan”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 19614 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003250229 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Handa Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:31:15 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_Handa”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 75986 in 2011

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003279551 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Mingulay Berneray Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 14:00:09 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package           Version
## popbio         "popbio"          "2.4.4"
## shiny          "shiny"           "1.1.0"
## shinyjs        "shinyjs"         "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"    "0.4.5"
## DT             "DT"              "0.5"
## plotly         "plotly"          "4.8.0"
## rmarkdown      "rmarkdown"       "1.10"
## dplyr          "dplyr"           "0.7.6"
## tidyr          "tidyr"           "0.8.1"
```

Basic information

This run had reference name “GU_MingulayBerneray”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 27054 in 2009

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003252754 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot North Colonsay Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 14:05:08 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_NorthColonsay”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 27000 in 2000

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003417037 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot North Rona Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:17:05 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_NorthRona”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10000 in 2012

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003259 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Rathlin Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 14:10:30 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_Rathlin”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 174796 in 2011

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003421245 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Shiants Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:38:32 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package           Version
## popbio         "popbio"          "2.4.4"
## shiny          "shiny"           "1.1.0"
## shinyjs        "shinyjs"         "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"    "0.4.5"
## DT             "DT"              "0.5"
## plotly         "plotly"          "4.8.0"
## rmarkdown      "rmarkdown"       "1.10"
## dplyr          "dplyr"           "0.7.6"
## tidyr          "tidyr"           "0.8.1"
```

Basic information

This run had reference name “GU_Shiants”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10296 in 2008

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.00325272 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Skomer Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 14:18:57 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_Skomer”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 32600 in 2013

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.01266656 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot St Kilda Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:49:02 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_StKilda”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 31400 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003252866 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common guillemot Sule Skerry Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 13:16:22 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_SuleSkerry”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 15266 in 1998

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.01496463 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Ailsa Craig 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:41:10 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_AilsaCraig”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10494 in 2013

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.0006842 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Canna Sanday 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:26:13 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Canna.Sanday”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 7826 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000647841 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Cape Wrath 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:05:40 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_CapeWrath”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 54718 in 2000

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000667605 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Flannan Isles 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:15:34 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_FlannanIsles”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 19614 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000650046 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Handa 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:06:24 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Handa”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 75986 in 2011

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.00065591 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Mingulay Berneray 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:31:17 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Mingulay.Berneray”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 27054 in 2009

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000650551 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot North Colonsay 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:36:03 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_NorthColonsay”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 27000 in 2000

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000683333 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot North Rona 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 13:32:59 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_NorthRona”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10000 in 2012

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000652 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Rathlin 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:45:31 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Rathlin”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 174796 in 2011

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000684226 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Shiants 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:10:50 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package           Version
## popbio         "popbio"          "2.4.4"
## shiny          "shiny"           "1.1.0"
## shinyjs        "shinyjs"         "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"    "0.4.5"
## DT             "DT"              "0.5"
## plotly         "plotly"          "4.8.0"
## rmarkdown      "rmarkdown"       "1.10"
## dplyr          "dplyr"           "0.7.6"
## tidyr          "tidyr"           "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Shiants”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10296 in 2008

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000650738 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Skomer 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:55:40 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package           Version
## popbio         "popbio"          "2.4.4"
## shiny          "shiny"           "1.1.0"
## shinyjs        "shinyjs"         "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"    "0.4.5"
## DT             "DT"              "0.5"
## plotly         "plotly"          "4.8.0"
## rmarkdown      "rmarkdown"       "1.10"
## dplyr          "dplyr"           "0.7.6"
## tidyr          "tidyr"           "0.8.1"
```

Basic information

This run had reference name “GU_70.20_Skomer”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 32600 in 2013

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002533436 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot StKilda 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 15:21:20 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_StKilda”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 31400 in 1999

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000650637 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Common Guillemot Sule Skerry 70*2 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 13:31:27 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GU_70.20_SuleSkerry”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 6.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 15266 in 1998

Productivity rate per pair: mean: 0.583 , sd: 1e-04

Adult survival rate: mean: 0.939 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.939 , sd: 1e-04 , DD: NA

Age class 5 to 6 - mean: 0.939 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002992925 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Northern Gannet Ailsa Craig Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 10:52:42 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GX_AilsaCraig”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Northern Gannet.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 66452 in 2014

Productivity rate per pair: mean: 0.766 , sd: 1e-04

Adult survival rate: mean: 0.919 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.424 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.829 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.891 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001601156 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Northern Gannet Grassholm Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 11:01:04 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “GX_Grassholm”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Northern Gannet.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 72022 in 2014

Productivity rate per pair: mean: 0.766 , sd: 1e-04

Adult survival rate: mean: 0.919 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.424 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.829 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.891 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001835828 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Northern Gannet Skelligs Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 11:11:11 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package           Version
## popbio         "popbio"          "2.4.4"
## shiny          "shiny"           "1.1.0"
## shinyjs        "shinyjs"         "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"    "0.4.5"
## DT             "DT"              "0.5"
## plotly         "plotly"          "4.8.0"
## rmarkdown      "rmarkdown"       "1.10"
## dplyr          "dplyr"           "0.7.6"
## tidyr          "tidyr"           "0.8.1"
```

Basic information

This run had reference name “GX_Skelligs”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Northern Gannet.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 70588 in 2014

Productivity rate per pair: mean: 0.766 , sd: 1e-04

Adult survival rate: mean: 0.919 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.424 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.829 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.891 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000191109 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-legged Kittiwake Ailsa Craig Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 08:58:11 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_AilsaCraig”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 980 in 2021

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002071429 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Howth Head Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 09:11:34 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_HowthHead”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 3586 in 2015

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.003176241 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Irelands Eye Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 09:05:34 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_IrelandsEye”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 3100 in 2015

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.004309677 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Lambay Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 09:02:08 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_Lambay”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 6640 in 2015

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.000512048 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Rathlin Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 08:57:33 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_Rathlin”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 27534 in 2021

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001300937 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Skomer Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 09:18:34 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_Skomer”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 2014 in 2022

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.03607249 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Skomer 30*3 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 20:08:38 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_Skomer_30.3”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: Reg.Seas.
Available colony-specific survival rate: Skomer (1978-2007). Sector to use within breeding success region: Irish Sea.
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 2014 in 2022

Productivity rate per pair: mean: 0.69 , sd: 0.296

Adult survival rate: mean: 0.854 , sd: 0.051

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 0.051 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 0.051 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 0.051 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: 30_3

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.007638115 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Wicklow Head Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 09:12:27 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_WicklowHead”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 1348 in 2015

Productivity rate per pair: mean: 0.619 , sd: 1e-04

Adult survival rate: mean: 0.854 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.005074184 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Black-Legged Kittiwake Wicklow Head 30*3 Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-26 20:04:36 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “KI_WicklowHead_30.3”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.
Region type to use for breeding success data: Reg.Seas.
Available colony-specific survival rate: Skomer (1978-2007). Sector to use within breeding success region: Irish Sea.
Age at first breeding: 4.
Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 1348 in 2015

Productivity rate per pair: mean: 0.69 , sd: 0.296

Adult survival rate: mean: 0.854 , sd: 0.051

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 0.051 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 0.051 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 0.051 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: 30_3

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001676707 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Cape Wrath Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:06:41 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_CapeWrath”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 4180 in 2000

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001519139 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Flannan Isles Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:44:37 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_FlannanIsles”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 2102 in 1998

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.00152236 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults
Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Handa Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:24:49 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_Handa”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.
Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 10330 in 2010

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001521781 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Mingulay Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:30:08 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_Mingulay”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.
Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 20222 in 2009

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001521116 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Rathlin Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:34:42 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_Rathlin”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.
Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 30786 in 2011

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001521796 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Shiants Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:25:30 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_Shiants”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.
Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 8496 in 2008

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001524247 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA

Razorbill Skomer Population Viability Analysis Parameter log

Set up

The log file was created on: 2024-09-23 15:39:07 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##                Package          Version
## popbio         "popbio"         "2.4.4"
## shiny          "shiny"          "1.1.0"
## shinyjs        "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets   "shinyWidgets"   "0.4.5"
## DT             "DT"             "0.5"
## plotly         "plotly"         "4.8.0"
## rmarkdown      "rmarkdown"      "1.10"
## dplyr          "dplyr"          "0.7.6"
## tidyr          "tidyr"          "0.8.1"
```

Basic information

This run had reference name “RA_Skomer”.
PVA model run type: simplescenarios.
Model to use for environmental stochasticity: betagamma.
Model for density dependence: nodd.
Include demographic stochasticity in model?: Yes.
Number of simulations: 5000.
Random seed: 1234.
Years for burn-in: 5.
Case study selected: None.

Baseline demographic rates

Species chosen to set initial values: Razorbill.
Region type to use for breeding success data: .
Available colony-specific survival rate: . Sector to use within breeding success region: .
Age at first breeding: 5.
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.
Number of subpopulations: 1.
Are demographic rates applied separately to each subpopulation?: No.
Units for initial population size: breeding.adults
Are baseline demographic rates specified separately for immatures?: Yes.

Population 1

Initial population values: Initial population 12002 in 2013

Productivity rate per pair: mean: 0.532 , sd: 1e-04

Adult survival rate: mean: 0.895 , sd: 1e-04

Immatures survival rates:

Age class 0 to 1 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 1 to 2 - mean: 0.794 , sd: 1e-04 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 1e-04 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 1e-04 , DD: NA

Impacts

Number of impact scenarios: 1.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

Impact on Demographic Rates

Scenario A - Name: Impact

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001383936 , se: NA

Output:

First year to include in outputs: 2030
Final year to include in outputs: 2065
How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA
Quasi-extinction threshold to use in calculating impact metrics: NA