# MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

## Consideration of impacts on ornithological features of Ramsar sites on the Isle of Man

Image of an offshore wind farm

## Document status

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# Contents

# Tables

# Appendix

**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**

# Glossary

| Term | Meaning |
|------|---------|
| Applicant | Morgan Offshore Wind Limited. |
| Appropriate Assessment | A step-wise procedure undertaken in accordance with Article 6(3) of the Habitats Directive, to determine the implications of a plan or project on a European site in view of the site's conservation objectives, where the plan or project is not directly connected with or necessary to the management of a European site but likely to have a significant effect thereon, either individually or in-combination with other plans or projects. |
| Competent Authority | The term derives from the Habitats Regulations and relates to the duties which the Regulations impose on public bodies and individuals. Regulation 6(1) defines competent authorities as 'any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office'. |
| Conservation Objectives | In its most general sense, a conservation objective is the specification of the overall target for the species and/or habitat types for which a site is designated in order for it to contribute to maintaining or reaching favourable conservation status of the habitats and species concerned, at the national, the biogeographical or the European level. |
| Development Consent Order (DCO) | An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP). |
| European site | A Special Area of Conservation (SAC), possible SAC (pSAC), or candidate SAC, (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a site of community importance (SCI). |
| Habitats Directive | The Habitats Directive is the short name for European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The Directive led to the establishing of European sites and setting out how they should be protected, it also extends to other topics such as European protected species. |
| Habitats Regulations | The Conservation (Natural Habitats, &c.) Regulations 1994, the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species 2017. |
| Habitats Regulations Assessment | A process required by the Habitats Regulations of identifying likely significant effects of a plan or project on a European site and (where likely significant effects are predicted or cannot be discounted) carrying out an appropriate assessment to ascertain whether the plan or project will adversely affect the integrity of the European site. If an adverse effect on European site integrity cannot be ruled out, the latter stages of the process require consideration of the derogation provisions in the Habitats Regulations. |
| In-combination Effects | The combined effect of the Morgen Generation Assets in-combination with the effects from a number of different plans or projects on the same feature/receptor. |
| Likely Significant Effect | Any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the European site was designated but excluding trivial or inconsequential effects. A likely effect is one that cannot be ruled out on the basis of objective information. A 'significant' effect is a test of whether a plan or project could undermine the site's conservation objectives. |
| Morgan Array Area | The area within which the wind turbines, foundations, inter-array cables, interconnector cables, scour protection, cable protection and offshore substation platforms (OSPs) forming part of the Morgan Offshore Wind Project: Generation Assets will be located. |

| Term | Meaning |
|---|---|
| Morgan Offshore Wind Project: Generation Assets | This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations and maintenance, and decommissioning). |
| Ramsar site | A wetland site designated to be of international importance under the Ramsar Convention. The Convention on Wetlands, known as the Ramsar Convention. |
| Special Area of Conservation (SAC) | Special Areas of Conservation (SACs) are areas designated under the European Union (EU) Habitat's Directive to help conserve certain plant and animals species listed in the Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). |
| Special Protection Area (SPA) | Special Protection Areas (SPAs) are sites classified under the EU Birds Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds.to protect rare or vulnerable birds (as listed on Annex I of the Directive), as well as regularly occurring migratory species. |
| The Planning Inspectorate | The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008. |

# Acronyms

| Acronym | Description |
|---|---|
| AEoI | Adverse Effect on Integrity |
| ASSI | Areas of Special Scientific Interest |
| BDMPS | Biologically Defined Minimum Population Scales |
| CGR | Counterfactual of Growth Rate |
| CPS | Counterfactual of Population Size |
| DAFF | Department of Agriculture Fisheries and Forestry |
| EIA | Environmental Impact Assessment |
| EMF | Electromagnetic Field |
| ExA | Examining Authority |
| HRA | Habitats Regulations Assessment |
| IoM | Isle of Man |
| ISAA | Information to Support an Appropriate Assessment |
| JNCC | Joint Nature Conservation Committee |
| LSE | Likely Significant Effect |
| MNRs | Marine Nature Reserves |
| NRW | Natural Resources Wales |
| PVA | Population Viability Analysis |
| SAC | Special Area of Conservation |

| Acronym | Description |
|---------|-------------|
| SMP | Seabird Monitoring Programme |
| SNCB | Statutory Nature Conservation Body |
| SPAs | Special Protection Areas |
| UK | United Kingdom |
| UKOTCF | UK Overseas Territories Conservation Forum |
| UXO | Unexploded ordnance |
| ZoI | Zone of Influence |

# Units

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

# 1 CONSIDERATION OF IMPACTS ON ORNITHOLOGICAL FEATURES OF RAMSAR SITES ON THE ISLE OF MAN

## 1.1 Introduction

### 1.1.1 Background

1.1.1.1 This clarification note has been produced in response to Issue Specific Hearing 2 (ISH2) Action Point 20 which is provided below:

*"Provide an update to the HRA screening report to record consideration of the IoM existing and proposed Ramsar Sites, so all the information is in one place".*

1.1.1.2 This ISH2 Action Point follows on from the Examining Authority's first round of written questions, specifically question MO 1.17 which is provided below:

*"Isle of Man Ramsar sites*

*The Isle of Man is not an EEA State and thus is not signed up to the Habitats/Birds Directives and do not designate SPAs and SACs. However, they are signatories to the Ramsar Convention.*

*Can the Applicant confirm whether any consideration has been given to the potential for effects on the following Isle of Man Ramsar sites (potential and listed) and if so, confirm the conclusions in this regard?*

- Ballaugh Curragh Ramsar site;

- Central Valley Curragh proposed Ramsar site;

- Dalby Peatlands proposed Ramsar site;

- Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site;

- Southern Coasts and Calf of Man proposed Ramsar site; and

- The Ayres proposed Ramsar site."

1.1.1.3 The Applicant responded to question MO1.17 within the Applicant's Response to Examining Authority's Written Questions (REP3-006) and confirmed that the Applicant used the maps data provided on the official Isle of Man Government website (https://www.gov.im/maps/) to identify the Isle of Man designated sites. With regards to the five proposed Ramsar sites listed by the Examining Authority on the Isle of Man, the Applicant notes that these sites are not included in the maps data provided on the official Isle of Man Government website (https://www.gov.im/maps/). The only reference that the Applicant is aware of relating to these sites is in the UK Overseas Territories Conservation Forum (UKOTCF) (2005) review of existing and proposed Ramsar sites in UK Overseas Territories and Crown Dependencies and associated Annex 2 of draft Ramsar Information Sheets (UKOTCF, 2005b). At no point during pre-application consultation, or in its Relevant Representation (RR-015), did the Isle of Man Government raise the five proposed Ramsar sites to the Applicant, nor request consideration of these in the Habitats Regulations Assessment (HRA) Stage 1 Screening Report (APP-099). The Applicant has, therefore, focussed on the Isle of Man Marine Nature Reserves (MNRs) in the Environmental Impact Assessment (EIA).

1.1.1.4 In addition, the Examining Authority, as part of their second round of written questions, specifically HRA 2.8, asked the following:

> *"Isle of Man Ramsar Sites*
>
> *Further to the Applicant's response to ExQ1 MO 1.17 the IoM Government TSC confirmed in their response to ISH2 action point 19 that the Applicant has given appropriate consideration to the relevant seabird colonies and listed/proposed Ramsar sites [REP4-039]. The Applicant is asked to ensure that the HRA screening report is updated by D6 to include the information provided. The IoM Government TSC and the Applicant are asked to include the matter in the next version of their SoCG."*

1.1.1.5    The IoM Government TSC full response (REP4-039) is provided below:

> *"Potential Ramsar sites were identified in a project with a contractor working with Crown Dependency and Overseas Territory governments. One of these (Ballaugh Curragh) has been designated and the others remain as site proposals, but not yet formally put forward for designation, though requiring consideration of national protection measures (e.g. ASSI) alongside Ramsar designation. They therefore do show where there is international level interest, but have not been given full protection across those areas. With regard to designated sites, we previously noted that there are Areas of Special Scientific Interest with designated costal cliff breeding bird interest, including seabirds, which haven't been listed as sites of national interest for ornithology, but also pointed out that some of our biggest seabird colonies are not currently designated as ASSIs, as this programme is not completed. The applicant therefore included all of the Manx colonies in coastal sections within the apportioning chapter on ornithology (Volume 4, Annex 5.5). Additionally, as identified by the applicant, the coastal potential Ramsar sites are covered within the Isle of Man Marine Nature Reserves (MNRs) which were covered in the ES. We are therefore content that an appropriate view has been given to these colonies within the Statement, which indicates no LSE and therefore concur with the Applicant's response to ExQ1 MO1.17".*

1.1.1.6    Due to the scope of the assessments required for the qualifying features of the proposed Ramsar sites, this clarification note has been produced as an addendum to HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments (APP-098). A separate document has been prepared to provide information to support appropriate assessment of the non-ornithological features of the proposed Ramsar sites (S_D5_3.3) as an addendum to HRA Stage 2 Information to Support an Appropriate Assessment (ISAA), Part Two: Special Areas of Conservation assessments (APP-097).

## 1.1.2    Context

1.1.2.1    The Applicant notes that the Isle of Man MNRs, which were designated in 2018 (under the Wildlife Act, 1990), provide coverage of most of the coastline of the Isle of Man, including the areas proposed to be covered by the Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site, the Southern Coasts and Calf of Man proposed Ramsar site and The Ayres proposed Ramsar site. The Applicant also notes that the proposed features of these proposed Ramsar sites are now designated under the Isle of Man MNRs. The Applicant has given due consideration to the potential for impacts to features of the Isle of Man MNRs, as identified as priorities by the Isle of Man Government, in the EIA.

1.1.2.2    However, this clarification note has been prepared to present an assessment of these proposed Ramsar sites to allow the Secretary of State to complete an Appropriate Assessment on these sites if they determine one is required.

1.1.2.3    The Information Sheets for the proposed Ramsar sites considered within this document come from the UK Overseas Territories Conservation Forum 2005 report 'Review of existing and potential Ramsar sites in UK Overseas Territories and Crown Dependencies' (UKOTCF) (2005) (hereafter referred to as the Site Information Sheet), which the Applicant believes are the most recent versions of the Information Sheets.

1.1.2.4    One of the sites within the UKOTCF 2005 review, The Ballaugh Curragh Ramsar site was fully designated in September 2006. The Applicant can confirm that the Ballaugh Curragh Ramsar site was considered as part of the HRA screening exercise undertaken in HRA Stage 1 Screening Report (APP-099). The ornithological features of the site (corncrake *Crex crex* and hen harrier *Circus cyaneus*) were both incorporated into the 'migratory waterbirds' bird category and no Likely Significant Effect (LSE) was identified for any designated sites at which these two species are qualifying features. However, to provide a complete assessment that aligns with the Ramsar sites mentioned in the Examining Authority's question, Ballaugh Curragh Ramsar site is included explicitly within this report. The other sites are still at a 'proposed' stage, with no confirmation from the Isle of Man Government as to their future status.

1.1.2.5    Within the review (UKOTCF, 2005) it is stated that:

*"The term 'proposed' when used in this report means proposed by this Review (or an earlier proposal confirmed by this Review). Whilst in most cases individuals or organisations in the territories concerned have been consulted on the list of proposed sites, it does not mean that these sites have been formally proposed to Government for designation. Thus whilst many of these sites have the potential to be proposed by the relevant authorities, 'proposed' is taken to mean 'potential sites that have been identified as meriting Ramsar designation by the Review of Existing and potential Ramsar sites in the UK Overseas Territories and Crown Dependencies'."*

1.1.2.6    It is for this reason that the Applicant believes the Isle of Man has focused on designating protected sites under their own legislation (e.g. MNR and/or Areas of Special Scientific Interest (ASSIs)).

1.1.2.7    In addition, the Applicant wishes to highlight that some of the bird species mentioned on the proposed Ramsar sites Information Sheets, do not surpass any threshold required for designation (e.g. 'of international importance') and therefore would not be named specifically under any of the Ramsar criterion applicable to birds (criteria 2, 3, 4, 5 and 6). However, these species have been included in the assessments presented below to ensure the information provided is as comprehensive as possible.

1.1.2.8    This report considers the likely impacts from the Morgan Generation Assets on these sites.

## 1.2    Methodology

### 1.2.1    Screening

1.2.1.1    The screening approach is split into two steps, firstly the identification of connectivity and secondly the determination of LSE.

#### Identification of connectivity

1.2.1.2    The approach categorises ornithological features into the following categories and applies different criteria to aid in the identification of connectivity and ultimately LSE:

- Breeding seabirds in the breeding season (e.g. kittiwake (*Rissa tridactyla*) at the Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site during the breeding season)

- Breeding seabirds in the non-breeding season (e.g. kittiwake at the Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site during the non-breeding season)

- Non-breeding seabirds (e.g. wintering divers at The Ayres proposed Ramsar site)

- Migratory seabirds (e.g. tern species (*Sternidae*) during migratory periods, as included on the designation for The Ayres proposed Ramsar)

- Migratory waterbirds (e.g. sanderling (*Calidris alba*) at The Ayres proposed Ramsar site during migratory periods).

1.2.1.3    In addition consideration is given to Marine Ramsar sites that protect areas of sea used by seabirds for behaviours such as foraging. Of relevance to this document this includes foraging areas utilised by gannet and tern species incorporated into the proposed designation of The Ayres proposed Ramsar site.

1.2.1.4    The criteria used to identify connectivity are identical to those used in the HRA Stage 1 Screening Report (APP-099) and are presented in Table 1.1.

**Table 1.1:    Spatial criteria used to identify connectivity for each bird category.**

| Bird category | Spatial criteria |
|---|---|
| Breeding seabirds in the breeding season | The Foraging Ranges Screening Tool is applied for relevant breeding seabirds. This tool was developed by NIRAS for NatureScot and applies the recommended screening parameters (i.e., Woodward *et al.*, 2019, mean maximum foraging range plus 1 SD) as recommended by NatureScot (2023) and by JNCC as part of the Expert Working Group (EWG05). The Foraging Ranges Screening Tool enables users to define or upload a shapefile of proposed development areas. The tool then identifies where the boundary overlaps with a foraging range(s) and provides a list of sites and features with potential connectivity to the Morgan Generation Assets project. |
| Marine Ramsar sites | Connectivity is identified with marine Ramsar sites, defined as Ramsar sites that cover a sea area that is used by birds from breeding colonies for foraging, roosting or other behaviours, when connectivity is identified with breeding colony Ramsar sites from which birds that utilise the marine Ramsar sites may originate. |
| Breeding seabirds in the non-breeding season | Breeding birds from SPAs and Ramsar sites in the non-breeding season are not constrained to specific areas due to the necessity to provision young, and typically disperse to exploit areas far beyond their breeding colonies. During the non-breeding season, therefore, the birds present within the Morgan Array Area may originate from sites that are further away than those considered in the breeding season. Furness (2015) considered how breeding seabirds disperse in the non-breeding season, defining the regions within which those populations would be distributed and for each region a Biologically Defined Minimum Population Scale (BDMPS) was calculated. Screening has applied those BDMPS regions and populations. Where the Morgan Generation Assets overlaps with a BDMPS region, potential connectivity is assumed with the population associated with that region (as defined by Furness, 2015) and the SPAs that contribute to that population. |
| Non-breeding seabirds in the non-breeding season | Where the Morgan Generation Assets overlaps with the SPA or Ramsar site boundary only. |

| Bird category | Spatial criteria |
|---|---|
| Migrating seabirds and migratory waterbirds | Migratory waterbirds and seabirds that breed in sites designated as SPA/Ramsar in areas of the UK that are distant from the project have some potential to interact with the Morgan Generation Assets during bi-annual migratory movements. Information has been obtained from relevant data sources to infer potential connectivity, namely; Wright *et al.*, 2012; WWT and MacArthur Green (2014). |

### 1.2.2 Determination of LSE

1.2.2.1 Following the identification of connectivity, consideration is given to the potential impact on each of those features for which connectivity has been identified. This is conducted by calculating collision and displacement impacts and apportioning them to the relevant features at each proposed Ramsar site. Where it is considered that the impact is more than negligible, an LSE is identified and the feature is considered for further assessment. This is detailed using a screening matrix and explanatory notes for each proposed Ramsar site. Consideration is also given to other factors, including the presence of immatures and sabbaticals, to inform the determination of LSE.

## 1.3 Ramsar sites for consideration

1.3.1.1 Table 1.2 identifies the qualifying features at each of the Ramsar sites identified by the Examining Authority.

**Table 1.2: Qualifying features of Ramsar sites included for consideration.**

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) | Screening category |
|---|---|---|---|
| Ballaugh Curragh Ramsar | 37.8 | Corncrake (*Crex crex*) | Migratory waterbird |
| | | Hen harrier (*Circus cyaneus*) | Migratory waterbird |
| Central Valley Curragh proposed Ramsar site | 27.1 | None | N/A |
| Dalby Peatlands proposed Ramsar site | 36.2 | Hen harrier (*Circus cyaneus*) | Migratory waterbird |
| Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site | 26.5 | Puffin (*Fratercula arctica*) | Breeding seabird in the breeding season / Breeding seabird in the non-breeding season |
| | | Kittiwake (*Rissa tridactyla*) | Breeding seabird in the breeding season / Breeding seabird in the non-breeding season |
| | | Common guillemot (*Uria aalge*) | Breeding seabird in the breeding season / Breeding seabird in the non-breeding season |
| | | Black guillemot (*Cepphus grylle*) | Breeding seabird in the breeding season |
| | | Razorbill (*Alca torda*) | Breeding seabird in the breeding season / Breeding seabird in the non-breeding season |

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) | Screening category |
|---|---|---|---|
| | | Herring gull (*Larus argentatus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Great black-backed gull (*Larus marinus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Lesser black-backed gull (*Larus fuscus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Cormorant (*Phalacrocorax carbo*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Fulmar (*Fulmarus glacialis*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| Southern Coasts and Calf of Man proposed Ramsar site | 26.8 | Puffin (*Fratercula arctica*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Kittiwake (*Rissa tridactyla*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Common guillemot (*Uria aalge*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Black guillemot (*Cepphus grylle*) | Breeding seabird in the breeding season |
| | | Herring gull (*Larus argentatus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Manx shearwater (*Puffinus puffinus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Razorbill (*Alca torda*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Great black-backed gull (*Larus marinus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Lesser black-backed gull (*Larus fuscus*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Shag (*Phalacrocorax aristotelis*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| | | Fulmar (*Fulmarus glacialis*) | Breeding seabird in the breeding season<br>Breeding seabird in the non-breeding season |
| The Ayres proposed Ramsar site | 40.0 | Little tern (*Sternula albifrons*) | Breeding seabird in the breeding season<br>Migratory seabird |
| | | Arctic tern (*Sterna paradisaea*) | Breeding seabird in the breeding season<br>Migratory seabird |
| | | Common tern (*Sterna hirundo*) | Breeding seabird in the breeding season<br>Migratory seabird |

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) | Screening category |
|---|---|---|---|
| | | Common gull (*Larus canus*) | Breeding seabird in the breeding season |
| | | | Breeding seabird in the non-breeding season |
| | | Black-headed gull (*Chroicocephalus ridibundus*) | Breeding seabird in the breeding season |
| | | | Breeding seabird in the non-breeding season |
| | | Great black-backed gull (*Larus marinus*) | Breeding seabird in the breeding season |
| | | | Breeding seabird in the non-breeding season |
| | | Herring gull (*Larus argentatus*) | Breeding seabird in the breeding season |
| | | | Breeding seabird in the non-breeding season |
| | | Lesser black-backed gull (*Larus fuscus*) | Breeding seabird in the breeding season |
| | | | Breeding seabird in the non-breeding season |
| | | Foraging areas for little tern, gannet (*Morus bassanus*) | Marine Ramsars |
| | | Wintering divers | Non-breeding seabirds in the non-breeding season |
| | | Sanderling (*Calidris alba*) | Migratory waterbird |

1.3.1.2    The Central Valley Curragh was proposed under Criterion 1 Particularly good surviving example of shrub-dominated riverside curraghs (carrs). The Central Valley Curragh proposed Ramsar site is located inland over 3 km from the coast and proposed for its terrestrial habitat features as a 'lowland flat river valley curraghs (carrs)', which has a 'retaining characteristic nature as one of the best remaining examples of a river-valley currragh'. Therefore, there is no potential for a receptor-impact pathway for any of the features of the Central Valley Curragh proposed Ramsar to the Morgan Generation Assets. As no ornithological features are included as part of the proposed designation for the Central Valley Curragh proposed Ramsar site, this site is not considered further in this report. A separate document has been prepared to provide information to support appropriate assessment of the non-ornithological features of the proposed Ramsar sites (S_D5_3.3) as an addendum to HRA Stage 2 Information to Support an Appropriate Assessment (ISAA), Part Two: Special Areas of Conservation assessments (APP-097).

1.3.1.3    Hen harrier at the Dalby Peatlands proposed Ramsar is identified in Table 1.2 and is therefore considered in the following sections. However, it should be noted that the Information Sheet for the Dalby Peatlands proposed Ramsar sites includes hen harrier, in the 'noteworthy fauna' section only with no mention of bird species as a criterion for proposed designation.

## 1.4 HRA Stage 1 – Screening

### 1.4.1 Identification of connectivity

#### Breeding seabirds in the breeding season

1.4.1.1 To determine if the proposed Ramsar sites have connectivity with the Morgan Generation Assets during the breeding season, those proposed Ramsar sites located within a species' mean-maximum foraging range plus one Standard Deviation (SD) (unless otherwise specified) were considered. The foraging ranges used to identify connectivity, which are presented in Table 1.3, are consistent with those recommended by JNCC during the Expert Working Group (EWG05) for the project.

**Table 1.3:** **Foraging ranges used to identify connectivity between proposed Ramsar breeding seabird colonies and the Morgan Generation Assets.**

| Species | Mean maximum foraging range (km) ± 1SD (unless otherwise stated) |
| --- | --- |
| Kittiwake | 156.1 ± 144.5 |
| Black-headed gull | 18.5 (Mean-max only) |
| Common gull | 50 (Mean-max only) |
| Great black-backed gull | 73 (Mean-max only) |
| Herring gull | 58.8 ± 26.8 |
| Lesser black-backed gull | 127 ± 109 |
| Little tern | 5 (Mean-max only) |
| Common tern | 18.0 ± 8.9 |
| Arctic tern | 25.7 ± 14.8 |
| Guillemot | 55.5 ± 39.7 (Use of mean max+1SD discounting Fair Isle values, as presented in Woodward *et al.* (2019)) |
| Razorbill | 73.8 ± 48.4 (Use of mean max+1SD discounting Fair Isle values, as presented in Woodward *et al.* (2019)) |
| Black guillemot | 4.8 ± 4.3 |
| Puffin | 137.1 ± 128.3 (excl. Fair Isle data = 119.6±131.2) (as requested by JNCC as part of the EWG) |
| Fulmar | 542.3 ± 657.9 |
| Manx shearwater | 1,346.8 ± 1,018.7 |
| Gannet | 315.2 ± 194.2 (for colonies without site specific maximum values. However, for Grassholm SPA and St Kilda SPA where site specific evidence exceeds this value (509.4 km), 516.7 km and 709 km are used respectively.) |
| Cormorant | 25.6 ± 8.3 |
| Shag | 13.2 ± 10.5 |

1.4.1.2 Based on the foraging ranges presented in Table 1.3, connectivity is identified between the Morgan Generation Assets and those features of the proposed Ramsar sites included in Table 1.4.

**Table 1.4:** **Breeding seabirds in the breeding season features of proposed Ramsar sites for which connectivity with the Morgan Generation Assets has been identified.**

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) | Connectivity (Yes/No) |
|---|---|---|---|
| Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site | 26.5 | Puffin (*Fratercula arctica*) | Yes |
| | | Kittiwake (*Rissa tridactyla*) | Yes |
| | | Common guillemot (*Uria aalge*) | Yes |
| | | Black guillemot (*Cepphus grylle*) | No |
| | | Razorbill (*Alca torda*) | Yes |
| | | Herring gull (*Larus argentatus*) | Yes |
| | | Great black-backed gull (*Larus marinus*) | Yes |
| | | Lesser black-backed gull (*Larus fuscus*) | Yes |
| | | Cormorant (*Phalacrocorax carbo*) | Yes |
| | | Fulmar (*Fulmarus glacialis*) | Yes |
| Southern Coasts and Calf of Man proposed Ramsar site | 26.8 | Puffin (*Fratercula arctica*) | Yes |
| | | Kittiwake (*Rissa tridactyla*) | Yes |
| | | Common guillemot (*Uria aalge*) | Yes |
| | | Black guillemot (*Cepphus grylle*) | No |
| | | Herring gull (*Larus argentatus*) | Yes |
| | | Manx shearwater (*Puffinus puffinus*) | Yes |
| | | Razorbill (*Alca torda*) | Yes |
| | | Great black-backed gull (*Larus marinus*) | Yes |
| | | Lesser black-backed gull (*Larus fuscus*) | Yes |
| | | Shag (*Phalacrocorax aristotelis*) | No |
| | | Fulmar (*Fulmarus glacialis*) | Yes |
| The Ayres proposed Ramsar site | 40.0 | Little tern (*Sternula albifrons*) | No |
| | | Arctic tern (*Sterna paradisaea*) | Yes |

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) | Connectivity (Yes/No) |
|---|---|---|---|
| | | Common tern (*Sterna hirundo*) | No |
| | | Common gull (*Larus canus*) | Yes |
| | | Black-headed gull (*Chroicocephalus ridibundus*) | No |
| | | Great black-backed gull (*Larus marinus*) | Yes |
| | | Herring gull (*Larus argentatus*) | Yes |
| | | Lesser black-backed gull (*Larus fuscus*) | Yes |

1.4.1.3    Connectivity has been identified for a total of twelve individual species (not features) that qualify as breeding features of the proposed Ramsar sites. To determine if species should be considered further in the breeding season, the abundance of each species during baseline surveys undertaken in the breeding season has been taken into account. Where a species has not been recorded during the breeding season or has been recorded in only small numbers that would not be commensurate with a measurable impact, it is discounted from further consideration in the breeding season only. This appraisal of population importance utilises the conclusions reached in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report (REP1-026) and expert judgement following recent similar approaches (RPS, 2021). Consideration may still be required however, in other seasons (e.g. where a species occurs on migration or in non-breeding seasons). Table 1.5 identifies which species are taken forward for further consideration.

**Table 1.5:    Abundance of species recorded by baseline aerial surveys at the Morgan Generation Assets during the breeding season.**

Notes:

[1] Full UK breeding season from Furness (2015) used for all species except fulmar where the migration-free breeding season has been used.

[2] Population importance is defined in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report (REP1-026).

| Species | Full UK breeding season (Furness (2015)[1] | Monthly occurrence | Abundance[2] | Further consideration |
|---|---|---|---|---|
| Kittiwake | March to August | Present in all breeding season surveys | Populations of regional importance in some months | Yes, species present in all breeding season months. |
| Common gull | April to August | Present in 1 of 10 breeding season surveys | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers in only one month. |

| Species | Full UK breeding season (Furness (2015)[1] | Monthly occurrence | Abundance[2] | Further consideration |
|---|---|---|---|---|
| Great black-backed gull | March to August | Present in 4 of 12 breeding season surveys | Population of regional importance in one month | Yes, species present in some breeding season months and of importance in one. |
| Herring gull | March to August | Present in 5 of 12 breeding season surveys | Populations of regional importance in some months | Yes, species present in some breeding season months. |
| Lesser black-backed gull | April to August | Present in 5 of 10 breeding season surveys | Populations of local importance in some months however may still lead to a measurable effect | Yes, species present in some breeding season months. |
| Arctic tern | May to August | Present in 1 of 8 breeding season surveys | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers in only one month. |
| Puffin | April to August | Present in 2 of 10 breeding season surveys | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers in only two months. |
| Fulmar | April to August | Present in 5 of 10 breeding season surveys | Populations of local importance in some months however may still lead to a measurable effect | Yes, species present in some breeding season months. |
| Manx shearwater | April to August | Present in 9 of 10 breeding season months | Populations of local importance in some months however may still lead to a measurable effect | Yes, species present in majority of breeding season months. |
| Common guillemot | March to July | Present in all breeding season surveys | Populations of local importance in some months however may still lead to a measurable effect | Yes, species present in all breeding season months. |
| Razorbill | April to July | Present in 5 of 8 breeding season surveys | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers. |
| Cormorant | April to August | Not recorded during baseline aerial surveys | | No, species not recorded during baseline aerial surveys. |

1.4.1.4    Following the exercise undertaken in Table 1.5, the following Ramsar sites and associated features are discounted from further consideration in the breeding season:

- Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site

- – Puffin

- – Razorbill

- – Cormorant

- Southern Coasts and Calf of Man proposed Ramsar site

- – Puffin

- – Razorbill

- The Ayres proposed Ramsar site

- – Arctic tern

- – Common gull.

## Marine Ramsar sites

1.4.1.5 The only proposed Ramsar site of relevance is The Ayres proposed Ramsar site which is proposed to be designated for foraging areas used by gannet and tern species. The Morgan Generation Assets is beyond 10 km from The Ayres proposed Ramsar site and it is therefore considered that there will be no LSE on the proposed Ramsar site.

## Breeding seabirds in the non-breeding season

1.4.1.6 To identify connectivity in non-breeding seasons (post-, non- and pre-breeding seasons) the BDMPS areas defined in Furness (2015) are used in HRA screening exercises, as recommended by Natural England (2022a). Due to the assumption that birds from multiple colonies are distributed equally throughout the areas associated with the BDMPS populations, this process therefore identifies connectivity between the relevant project and all Ramsar sites for a species within the BDMPS area.

1.4.1.7 To ensure that the approach to screening is not overly precautionary a two stage process has been implemented. The first stage considers the results of the baseline aerial surveys to identify if each species was present in non-negligible numbers during the non-breeding seasons of relevance (Table 1.6). Where a species has not been recorded during the non-breeding seasons of relevance or has been recorded in only small numbers that would not be commensurate with a measurable impact, it is discounted for further consideration in the relevant non-breeding seasons only. This appraisal of population importance utilises the conclusions reached in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report (REP1-026) and expert judgement.

**Table 1.6: Abundance of species recorded during baseline aerial surveys at the Morgan Generation Assets during the non-breeding season (i.e. the time period outside of the breeding season).**

| Species | Non-breeding seasons (based on seasonal extents defined by Furness (2015)) | Monthly occurrence | Abundance | Further consideration |
|---|---|---|---|---|
| Kittiwake | Post-breeding = August to December | Recorded in all non-breeding season months | Populations of local importance in some months however may | Yes, recorded in all non-breeding season months in nearly all months |

| Species | Non-breeding seasons (based on seasonal extents defined by Furness (2015)) | Monthly occurrence | Abundance | Further consideration |
|---|---|---|---|---|
| | Pre-breeding = January to April | | still lead to a measurable effect | |
| Black-headed gull | Non-breeding = September to March | Not recorded during baseline aerial surveys | | No, species not recorded during baseline aerial surveys |
| Common gull | Non-breeding = September to March | Recorded in 7 of 14 non-breeding season months | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers |
| Great black-backed gull | Non-breeding = September to March | Recorded in 8 of 14 non-breeding season months | Populations of regional importance in some months | Yes, birds in present in most non-breeding season months with relatively high populations in most months |
| Herring gull | Non-breeding = September to February | Recorded in 8 of 12 non-breeding season months | Populations of local importance in some months however may still lead to a measurable effect | Yes, birds in present in most non-breeding season months with relatively high populations in most months |
| Lesser black-backed gull | Post-breeding = August to October<br><br>Non-breeding = November to February<br><br>Pre-breeding = March to April | Recorded in 9 of 18 non-breeding season months | Populations of local importance in some months however may still lead to a measurable effect | Yes, abundance in the post-breeding season relatively high |
| Guillemot | Non-breeding = August to February | Recorded in all non-breeding season months | Populations of local importance in some months however may still lead to a measurable effect | Yes, recorded in all non-breeding season months in nearly all months |
| Razorbill | Post-breeding = August to October<br><br>Non-breeding = November to December<br><br>Pre-breeding = January to March | Recorded in all but two non-breeding season months | Populations of local importance in some months however may still lead to a measurable effect | Yes, recorded in the majority of non-breeding season months |
| Puffin | Non-breeding = August to March | Recorded in 2 of 16 non-breeding season months | Populations of local importance but not considered likely to result in a measurable effect | No, recorded in small numbers in only two months |
| Fulmar | Post-breeding = September to October | Recorded in 9 of 14 non-breeding season | Populations of local importance in some months however may | Yes, species in the majority of months in numbers considered to |

| Species | Non-breeding seasons (based on seasonal extents defined by Furness (2015)) | Monthly occurrence | Abundance | Further consideration |
|---|---|---|---|---|
| | Non-breeding = November<br><br>Pre-breeding = December to March | months, mainly in the pre-breeding season | still lead to a measurable effect | be more than negligible |
| Manx shearwater | Post-breeding = August to October<br><br>Pre-breeding = March to May | Recorded in 5 of 12 non-breeding season months, mainly in the post-breeding season | Populations of local importance in some months however may still lead to a measurable effect | Yes, species in the majority of months in numbers considered to be more than negligible |
| Cormorant | Non-breeding = September to January | Not recorded during baseline aerial surveys | | No, species not recorded during baseline aerial surveys |
| Shag | Non-breeding = September to January | Not recorded during baseline aerial surveys | | No, species not recorded during baseline aerial surveys |

1.4.1.8    On the basis of low abundance within the baseline aerial survey area, puffin (Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site and Southern Coasts and Calf of Man proposed Ramsar site) and cormorant (Gob ny Rona, Maughold Head proposed Ramsar site) are excluded from further consideration.

1.4.1.9    The remaining species of relevance are fulmar, lesser black-backed gull, herring gull, great black-backed gull, Manx shearwater. kittiwake, guillemot and razorbill with these species having been recorded in greater abundance during the baseline aerial surveys, in most cases, throughout the species-specific non-breeding seasons.

1.4.1.10   Following the approach in HRA Stage 1 Screening Report (APP-099) consideration has been given to the contribution of the populations of the proposed features of the proposed Ramsar sites to the BDMPS populations that could interact with the Morgan Generation Assets (Table 1.7). BDMPS populations have been sourced from Furness (2015) with populations for each of the proposed features at each of the proposed Ramsar sites sourced from the Seabird 2000 dataset available on an archived version of the JNCC website[1]. The population for each species has been taken from the Seabird 2000 census to ensure population estimates are commensurate with the data used in Furness (2015).

1.4.1.11   Based on the calculations presented in Table 1.7, only herring gull at the Southern Coasts and Calf of Man proposed Ramsar site requires consideration in the determination of LSE stage of screening, as this is the only site where the contribution of the site to the BDMPS of relevance to herring gull exceeds 1%.

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[1] https://webarchive.nationalarchives.gov.uk/ukgwa/20190301135521/http://jncc.defra.gov.uk/page-4460-theme=default

**Table 1.7:** **The contribution of the populations of the proposed features of the proposed Ramsar sites to the relevant BDMPS population for breeding seabirds in the non-breeding seasons for which connectivity was identified.**

Note: Cells highlighted green denote those for which the contribution of the population at the proposed Ramsar site exceeds 1%.

| Proposed Ramsar site | Percentage contribution to BDMPS population (%) | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Fulmar | | | Manx shearwater | | Lesser black-backed gull | | | Herring gull | Great black-backed gull | Kittiwake | | Guillemot | Razorbill | | |
| | Post-breeding | Non-breeding | Pre-breeding | Post-breeding | Pre-breeding | Post-breeding | Non-breeding | Pre-breeding | Non-breeding | Non-breeding | Post-breeding | Pre-breeding | Non-breeding | Post-breeding | Non-breeding | Pre-breeding |
| Gob ny Rona, Maughold Head and Port Cornaa | 0.06 | 0.06 | 0.06 | N/A | N/A | 0.02 | 0.03 | 0.02 | 0.996 | 0.06 | 0.03 | 0.05 | 0.05 | 0.04 | 003 | 0.04 |
| Southern Coasts and Calf of Man | 0.41 | 0.43 | 0.41 | <0.01 | <0.01 | 0.02 | 0.03 | 0.02 | 2.69 | 0.3 | 0.11 | 0.19 | 0.49 | 0.26 | 0.19 | 0.26 |
| The Ayres | N/A | N/A | N/A | N/A | N/A | 0.02 | 0.04 | 0.02 | 0.11 | <0.01 | N/A | N/A | N/A | N/A | N/A | N/A |

### Non-breeding seabirds in the non-breeding season

1.4.1.12    The only proposed Ramsar site of relevance is The Ayres proposed Ramsar site which is proposed to be designated for wintering diver species. The Morgan Generation Assets is located 40 km from The Ayres proposed Ramsar site. This is beyond the distance used to identify potential LSE for diver species (10 km) and it is therefore considered that there will be no LSE on the proposed Ramsar site.

### Migratory seabirds

1.4.1.13    The identification of connectivity for migratory seabirds has utilised the migratory corridors defined in WWT Consulting and MacArthur Green (2014), extending these into Isle of Man waters. Where the species-specific migratory corridor overlaps with the Morgan Generation Assets, then connectivity is identified for that species (Table 1.8). The only species of relevance, based on the proposed designations for the proposed Ramsar sites, are little tern, Arctic tern and common tern which are all proposed features of the proposed The Ayres Ramsar site.

**Table 1.8:    Identification of migratory seabird species for which there is connectivity with the Morgan Generation Assets.**

| Species | Latin name | Migratory corridor (km) | Overlap with Morgan Generation Assets (Yes/No) |
|---------|-----------|------------------------|------------------------------------------------|
| Little tern | *Sternula albifrons* | 0-10 | No |
| Common tern | *Sterna hirundo* | 0-10 | No |
| Arctic tern | *Sterna paradisaea* | 0-10 | No |

1.4.1.14    Based on the migratory corridors of these species there is no connectivity with the Morgan Generation Assets and therefore no LSE is identified.

### Migratory waterbirds

1.4.1.15    The features of relevance in this feature category are corncrake and hen harrier at the Ballaugh Curragh Ramsar, hen harrier at the Dalby Peatlands proposed Ramsar site and sanderling at The Ayres proposed Ramsar site.

1.4.1.16    Volume 4, Annex 5.4: Migratory collision risk modelling technical report (APP-056) identifies those species that may interact with the Morgan Generation Assets whilst on migration using the migratory polygons associated with Wright *et al.* (2012). It also provides numbers of predicted collisions of migratory waterbird species based on the species/populations identified to be at risk of crossing the Morgan Array Area.

1.4.1.17    Collision risk modelling for migratory waterbirds showed that, at an avoidance rate of 98% (the use of which follows SNH (2010)), the numbers of birds predicted to be affected were <1 individual for most species. In all cases the predicted collision risk estimates represented less than 0.1% of the baseline mortality of the biogeographic population (Appendix A of the HRA Stage 1 Screening Report (APP-099)) and on this basis all species and associated proposed Ramsar sites are not considered further.

### Summary of initial screening of sites for offshore ornithological features

1.4.1.18 Based on the consideration of connectivity undertaken for each feature category the proposed Ramsar sites and associated qualifying features listed in Table 1.9 are progressed to the Determination of LSE stage of the screening exercise.

**Table 1.9:    Summary of Ramsar sites progressed to the determination of LSE stage.**

| Ramsar site | Distance to the Morgan Generation Assets (km) | Ornithological qualifying features (UKOTCF, 2005) |
|---|---|---|
| Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site | 26.5 | Kittiwake (*Rissa tridactyla*) |
| | | Common guillemot (*Uria aalge*) |
| | | Razorbill (*Alca torda*) |
| | | Herring gull (*Larus argentatus*) |
| | | Great black-backed gull (*Larus marinus*) |
| | | Lesser black-backed gull (*Larus fuscus*) |
| | | Fulmar (*Fulmarus glacialis*) |
| Southern Coasts and Calf of Man proposed Ramsar site | 26.8 | Kittiwake (*Rissa tridactyla*) |
| | | Common guillemot (*Uria aalge*) |
| | | Herring gull (*Larus argentatus*) |
| | | Manx shearwater (*Puffinus puffinus*) |
| | | Razorbill (*Alca torda*) |
| | | Great black-backed gull (*Larus marinus*) |
| | | Lesser black-backed gull (*Larus fuscus*) |
| | | Fulmar (*Fulmarus glacialis*) |
| The Ayres proposed Ramsar site | 40.0 | Great black-backed gull (*Larus marinus*) |
| | | Herring gull (*Larus argentatus*) |
| | | Lesser black-backed gull (*Larus fuscus*) |

## 1.4.2    Determination of LSE

1.4.2.1 A screening matrix is presented for each proposed Ramsar site setting out whether no LSE can be concluded for the relevant features of each site identified in Table 1.9. All impacts considered in HRA Stage 1 Screening Report (APP-099) are considered in the matrices for the proposed Ramsar sites. Impacts in each project phase (C= construction, O&M = operations and maintenance and D = decommissioning) are considered in each matrix.

1.4.2.2 Table 1.11 to Table 1.13 present the results of the LSE determination assessment as a result of impacts associated with the Morgan Generation Assets on relevant qualifying interest features of the proposed Ramsar sites. When determining LSE, where the predicted impact is considered to be negligible (i.e. less than one bird/annum) then the potential for LSE on that feature of the proposed Ramsar site is discounted. Consideration is also given to other factors, including the presence of

immatures and sabbaticals, to inform the determination of LSE. This is detailed using a screening matrix and explanatory notes for each proposed Ramsar site.

## Apportioning of impacts

1.4.2.3    Following the approach in HRA Stage 1 Screening Report (APP-099), impact estimates for each species have been apportioned to each proposed Ramsar site for which connectivity has been identified. In the breeding season this incorporates the proportion applicable to each Ramsar site and the proportion applicable to adult birds only (i.e. removing immature birds), where age class information is available from site-specific surveys. Where this is not available qualitative consideration is provided in the justifications provided below (Table 1.11 to Table 1.13). The results of the apportioning approach are presented in Table 1.10. The approach utilises impact estimates calculated using the best available evidence as discussed in Volume 4, Annex 5.3 Offshore ornithology collision risk modelling technical report (APP-055) and Volume 2, Chapter 5: Offshore ornithology (APP-023). With the exception of common guillemot at the Southern Coasts and Calf of Man proposed Ramsar site (2.4 birds/annum) and herring gull at The Ayres proposed Ramsar site (0.6 birds/annum), the predicted impact represents less than 0.5 birds/annum.

**Table 1.10:  Apportioned impacts for proposed Ramsar features.**

| Ramsar site | Ornithological qualifying features (UKOTCF, 2005) | Impact | Apportioning value | | | | Apportioned impact (no. of birds) |
|---|---|---|---|---|---|---|---|
| | | | Breeding | Post-breeding | Non-breeding | Pre-breeding | |
| Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site | Kittiwake (*Rissa tridactyla*) | Collision | 0.014 | <0.001 | - | <0.001 | 0.0 |
| | Kittiwake (*Rissa tridactyla*) | Displacement | 0.014 | <0.001 | - | <0.001 | 0.0 |
| | Common guillemot (*Uria aalge*) | Displacement | 0.019 | - | <0.001 | - | 0.4 |
| | Razorbill (*Alca torda*) | Displacement | 0.027 | <0.001 | <0.001 | <0.001 | 0.0 |
| | Herring gull (*Larus argentatus*) | Collision | 0.014 | - | 0.010 | - | 0.1 |
| | Great black-backed gull (*Larus marinus*) | Collision | 0.048 | - | 0.001 | - | 0.0 |
| | Lesser black-backed gull (*Larus fuscus*) | Collision | <0.001 | <0.001 | <0.001 | <0.001 | 0.0 |
| | Fulmar (*Fulmarus glacialis*) | Displacement | 0.077 | 0.001 | 0.001 | 0.001 | 0.0 |
| Southern Coasts and Calf of Man proposed | Kittiwake (*Rissa tridactyla*) | Collision | 0.085 | 0.001 | - | 0.002 | 0.2 |
| | Kittiwake (*Rissa tridactyla*) | Displacement | 0.085 | 0.001 | - | 0.002 | 0.2 |

| Ramsar site | Ornithological qualifying features (UKOTCF, 2005) | Impact | Apportioning value | | | | Apportioned impact (no. of birds) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | Breeding | Post-breeding | Non-breeding | Pre-breeding | |
| Ramsar site | Common guillemot (*Uria aalge*) | Displacement | 0.116 | - | 0.005 | - | 2.4 |
| | Herring gull (*Larus argentatus*) | Collision | 0.038 | - | 0.027 | - | 0.2 |
| | Manx shearwater (*Puffinus puffinus*) | Collision | 0.024 | <0.001 | - | <0.001 | 0.0 |
| | Manx shearwater (*Puffinus puffinus*) | Displacement | 0.024 | <0.001 | - | <0.001 | 0.1 |
| | Razorbill (*Alca torda*) | Displacement | 0.215 | 0.003 | 0.002 | 0.003 | 0.1 |
| | Great black-backed gull (*Larus marinus*) | Collision | 0.219 | - | 0.003 | - | 0.0 |
| | Lesser black-backed gull (*Larus fuscus*) | Collision | 0.003 | <0.001 | <0.001 | <0.001 | 0.0 |
| | Fulmar (*Fulmarus glacialis*) | Displacement | 0.153 | 0.004 | 0.004 | 0.004 | 0.0 |
| The Ayres proposed Ramsar site | Great black-backed gull (*Larus marinus*) | Collision | 0.025 | - | 0.003 | - | 0.0 |
| | Herring gull (*Larus argentatus*) | Collision | 0.001 | - | 0.107 | - | 0.6 |
| | Lesser black-backed gull (*Larus fuscus*) | Collision | <0.001 | 0.023 | 0.037 | 0.023 | 0.0 |

**Table 1.11:** LSE matrix for offshore ornithological features of the Gob ny Rona, Maughold Head and Port Cornaa proposed Ramsar site.

| Proposed Ramsar qualifying feature | Temporary habitat loss/disturbance and increased SSC | | | Disturbance and displacement from airborne sound and presence of vessels and infrastructure | | | Collision risk | | | Barrier to movement | | | Changes in prey availability | | | Accidental pollution | | | In-combination effects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D |
| Kittiwake | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Common guillemot | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Razorbill | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Herring gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Great black-backed gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Lesser black-backed gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Fulmar | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where LSE has been ruled out a ✕ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

a. **Temporary habitat loss/disturbance and increased SSC** - Temporary habitat loss/disturbance and increased SSC due to all phases of the Morgan Generation Assets is unlikely to have effects on proposed Ramsar seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for

other functions (e.g. roosting). The features for which LSE have been identified at this proposed Ramsar site are also not vulnerable to disturbance and displacement impacts (Wade *et al.,* 2016). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for any qualifying feature of this proposed Ramsar site.

b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5 of the HRA Stage 1 Screening Report (APP-099). Great black-backed gull, lesser black-backed gull and herring gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the great black-backed gull, lesser black-backed gull and herring gull qualifying feature of this proposed Ramsar. The Apportioning Assessment (Table 1.10) estimated that the predicted impact associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot, razorbill and fulmar was less than 0.5 birds/annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot, razorbill and fulmar features of this proposed Ramsar. For kittiwake, the predicted impact associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was less than zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this proposed Ramsar.

c. **Collision risk** - Fulmar, common guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar, common guillemot and razorbill qualifying features of this Ramsar site. For kittiwake, great black-backed gull, herring gull and lesser black-backed gull, the Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the number of expected collisions was less than 0.5 birds/annum. The potential for LSE is therefore discounted for these features of this proposed Ramsar.

d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this proposed Ramsar due to the distance from the Morgan Generation Assets (26.5 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this Ramsar site, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of the features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and

displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this Ramsar site.

e. **Changes in prey availability** - As set out in paragraph 1.4.5.7 of the HRA Stage 1 Screening Report (APP-099), no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to bird populations for the majority of the proposed Ramsar sites considered, as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post-consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the Ramsar site (26.5 km from the Morgan Array Area) any effects should they occur, will not directly affect the proposed Ramsar. On this basis, there is considered to be no potential for LSE on qualifying interest features of the proposed Ramsar as a result of accidental pollution.

g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this proposed Ramsar may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to displacement and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is considered to be negligible or it has been concluded for the project alone that there is no LSE, it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

**Table 1.12:** LSE matrix for offshore ornithological features of the Southern Coasts and Calf of Man proposed Ramsar site.

| Proposed Ramsar qualifying feature | Temporary habitat loss/disturbance and increased SSC | | | Disturbance and displacement from airborne sound and presence of vessels and infrastructure | | | Collision risk | | | Barrier to movement | | | Changes in prey availability | | | Accidental pollution | | | In-combination effects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D |
| Kittiwake | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Common guillemot | ×a | ×a | ×a | ×b | ✓b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ✓g | ×g |
| Herring gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Manx shearwater | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Razorbill | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Great black-backed gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Lesser black-backed gull | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Fulmar | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where LSE has been ruled out a ✗ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

a. **Temporary habitat loss/disturbance and increased SSC -** Temporary habitat loss/disturbance and increased SSC due to all phases of the Morgan Generation Assets is unlikely to have effects on proposed Ramsar seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for

other functions (e.g. roosting). The features for which LSE have been identified at this proposed Ramsar site are also not vulnerable to disturbance and displacement impacts (Wade *et al.,* 2016). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for any qualifying feature of this proposed Ramsar.

b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5 of the HRA Stage 1 Screening Report (APP-099). Great black-backed gull, lesser black-backed gull and herring gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the great black-backed gull, lesser black-backed gull and herring gull qualifying feature of this Ramsar site. The Apportioning Assessment (Table 1.10) estimated that the predicted impact associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for razorbill, Manx shearwater and fulmar was less than 0.5 birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the razorbill, Manx shearwater and fulmar features of this proposed Ramsar. The Apportioning Assessment (Table 1.10) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake and Manx shearwater was less than 0.5 birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this proposed Ramsar. For guillemot, the Apportioning Assessment (Table 1.10) estimated that the predicted impact from airborne sound and presence of vessels and infrastructure would be greater than one bird/annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this proposed Ramsar.

c. **Collision risk** - Fulmar, common guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar, common guillemot and razorbill qualifying features of this Ramsar site. The Apportioning Assessment undertaken for the Morgan Generation Assets (Table 1.10) estimated that the maximum annual mortality associated with collisions for kittiwake, great black-backed gull, herring gull, lesser black-backed gull and Manx shearwater was less than 0.5 birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these features of the proposed Ramsar.

d.  **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this proposed Ramsar due to the distance from the Morgan Generation Assets (26.8 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this Ramsar site, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this Ramsar site.

e.  **Changes in prey availability** - As set out in paragraph 1.4.5.7 of the HRA Stage 1 Screening Report (APP-099), no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to bird populations for the majority of the proposed Ramsar sites considered, as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

f.  **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post-consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the Ramsar site (26.8 km from the Morgan Array Area) any effects should they occur, will not directly affect the proposed Ramsar. On this basis, there is considered to be no potential for LSE on qualifying interest features of the proposed Ramsar as a result of accidental pollution.

g.  **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this proposed Ramsar may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to displacement and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is considered to be negligible or it has been concluded for the project alone that there is no LSE, it is considered that the Morgan Generation Assets will not act in-combination with other plans

and projects and therefore no LSE is concluded.

**Table 1.13:   LSE matrix for offshore ornithological features of The Ayres proposed Ramsar site.**

| Proposed Ramsar qualifying feature | Temporary habitat loss/disturbance and increased SSC | | | Disturbance and displacement from airborne sound and presence of vessels and infrastructure | | | Collision risk | | | Barrier to movement | | | Changes in prey availability | | | Accidental pollution | | | In-combination effects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D | C | O&M | D |
| Great black-backed gull (*Larus marinus*) | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Herring gull (*Larus argentatus*) | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |
| Lesser black-backed gull (*Larus fuscus*) | ×a | ×a | ×a | ×b | ×b | ×b | | ×c | | | ×d | | ×e | ×e | ×e | ×f | ×f | ×f | ×g | ×g | ×g |

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where LSE has been ruled out a ✕ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

a. **Temporary habitat loss/disturbance and increased SSC -** Temporary habitat loss/disturbance and increased SSC due to all phases of the Morgan Generation Assets is unlikely to have effects on proposed Ramsar seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). The features for which LSE have been identified at this proposed Ramsar are also not vulnerable to disturbance and displacement impacts (Wade *et al.,* 2016). On this basis, it is considered that

there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for any qualifying feature of this proposed Ramsar.

b.  **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5 of the HRA Stage 1 Screening Report (APP-099). Great black-backed gull, lesser black-backed gull and herring gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the great black-backed gull, lesser black-backed gull and herring gull qualifying feature of this Ramsar site.

c.  **Collision risk** - For great black-backed gull, herring gull and lesser black-backed gull, the Apportioning Assessment undertaken for the Morgan Generation Assets (Table 1.10) estimated that the expected collisions was less than one bird per annum. The potential for LSE is therefore discounted for these features of this proposed Ramsar.

d.  **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this proposed Ramsar due to the distance from the Morgan Generation Assets (40 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this Ramsar site, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this Ramsar site.

e.  **Changes in prey availability** - As set out in paragraph 1.4.5.7 of the HRA Stage 1 Screening Report (APP-099), no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to bird populations for the majority of the proposed Ramsar sites considered, as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

f.  **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent.

In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post-consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the Ramsar site (40 km from the Morgan Array Area) any effects should they occur, will not directly affect the proposed Ramsar. On this basis, there is considered to be no potential for LSE on qualifying interest features of the proposed Ramsar as a result of accidental pollution.

g.  **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this proposed Ramsar may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to displacement and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is considered to be negligible or it has been concluded for the project alone that there is no LSE, it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

## 1.5 HRA Stage 2 – Appropriate Assessment

### 1.5.1 Overview

1.5.1.1 The potential for LSE as a result of the Morgan Generation Assets was identified with respect to the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure. This section therefore provides information to support an appropriate assessment following the methodology applied in HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments (APP-098).

### 1.5.2 Methodology

#### Integrity test: Step 1

1.5.2.1 Where the potential impact of the Morgan Generation Assets alone represents less than a 0.05% increase in baseline mortality of the relevant proposed Ramsar population, then consideration is not given to the potential impact of the Morgan Generation Assets in-combination with other plans and projects. In these instances it is considered that the Morgan Generation Assets will not contribute to the existing in-combination impact as the impact predicted for the Morgan Generation Assets is not measurable and is within the limits of natural variation. If the Morgan Generation Assets alone contributed to an increase in baseline mortality of more than 0.05%, in-combination impacts were also considered within the integrity test: Step 1.

1.5.2.2 For sites for which LSE was concluded in relation to potential impacts during the breeding and/or non-breeding seasons, if the predicted impact associated with the Morgan Generation Assets alone and in-combination represents less than a 1% increase in the baseline mortality of the designated population for a qualifying feature, then a high level assessment has been presented and a conclusion of no Adverse Effect on Integrity (AEOI) has been concluded.

1.5.2.3 If the predicted impact magnitude is more than a 1% increase in the baseline mortality for either the Morgan Generation Assets alone or the Morgan Generation Assets in-combination with other projects, an AEOI cannot be ruled out and the Ramsar site and associated qualifying features have been progressed to the Integrity test: Step 2.

1.5.2.4 The impacts applied in the Integrity test: Step 1 represent those calculated when applying the best available evidence.

#### Integrity test: Step 2

1.5.2.5 Where the impacts associated with any feature of a proposed Ramsar site meet the criteria described above, the proposed Ramsar site and associated qualifying feature are progressed to Integrity test: Step 2. This stage of the HRA presents a more detailed assessment incorporating, where relevant, population modelling and other evidence to inform conclusions in relation to adverse effect on site integrity.

### 1.5.3 Assessment

#### Integrity test: Step 1

1.5.3.1 The Integrity test: Step 1 has utilised the impact magnitudes as predicted in the relevant technical reports (Volume 4, Annex 5.2: Offshore ornithology displacement

technical report (APP-054) and Volume 4, Annex 5.3: Offshore ornithology collision risk modelling technical report (APP-055)) and then apportioned to each Ramsar site using the apportioning values calculated as part of the analysis undertaken in Annex 4.7 to Response to Hearing Action Point 15: Apportioning Sensitivity Analysis (REP1-012). As only guillemot has been progressed to HRA Stage 2 – Appropriate Assessment, no consideration is given in the Integrity test: Step 1 to immature guillemot and, following the approach applied in HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments (APP-098), the impact on sabbatical birds is not considered at this stage.

1.5.3.2    Where the potential impact of the Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the relevant populations, then consideration is not given to the impact of the Morgan Generation Assets in-combination with other plans and projects. In these instances, it is considered that the Morgan Generation Assets will not contribute to the existing in-combination impact as the impact predicted for the Morgan Generation Assets is not measurable and is within the limits of natural variation.

1.5.3.3    The proposed Ramsar populations used in Step 1 represent the most recent population for each feature with these primarily sourced from the Seabirds Count dataset (Burnell *et al.*, 2023) or where a more recent complete count is available from the Seabird Monitoring Programme (SMP) database (JNCC, 2023) or other relevant sources.

1.5.3.4    For potential in-combination impacts (disturbance and displacement from airborne noise, underwater sound, and presence of vessels and infrastructure during the operations and maintenance phase), the seasonal abundance values and seasonal collision values are presented in Volume 2, Chapter 5: Offshore ornithology (APP-023) for those projects with project-specific documentation, Annex 4.5 to Response to Hearing Action Point 15: Offshore Ornithology CEA and In-combination Gap-filling of Historical Projects Note (REP1-010) and Review of Cumulative Effects Assessment and In-Combination Assessment: Offshore ornithology (REP3-019). Apportioning values have been sourced from project-specific literature where available. If unavailable the apportioning value calculated for the nearest project has been applied. The assumptions in relation to apportioning are provided alongside relevant tables in the proposed Ramsar-specific sections below.

### Southern Coasts and Calf of Man proposed Ramsar site

1.5.3.5    The Step 1 integrity test for the Southern Coasts and Calf of Man proposed Ramsar site is presented below for the Morgan Generation Assets alone (Table 1.14). The assessment considers the guillemot feature of the proposed Ramsar in relation to potential disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts. The population at the proposed Ramsar was sourced from Burnell *et al.* (2023).

**Table 1.14:    Step 1 integrity test for the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets acting alone.**

| Qualifying feature | Seasonal apportioning values | | Total predicted impact (birds/annum) | Proposed Ramsar population (breeding adults) | % increase in baseline mortality | Conclusion |
|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | | | | |
| Guillemot | 0.116 | 0.005 | 2.4 | 6,362 | 0.62 | No potential for AEOI from the Morgan Generation Assets alone |

1.5.3.6    The predicted impact of the Morgan Generation Assets alone on the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site represents more than a 0.05% increase in baseline mortality for the population at the proposed Ramsar. As the potential impact represents more than a 0.05% increase in baseline mortality, consideration is given to the existing in-combination impact (Table 1.15).

**Table 1.15:** **Step 1 integrity test for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets acting in-combination with other projects/plans in relation to potential disturbance and displacement from airborne noise, underwater sound, and presence of vessels and infrastructure impacts.**

[1] Apportioning value assumed to be the same as for the Mona Offshore Wind Project

[2] Apportioning value assumed to be the same as for the Morgan Generation Assets.

| Project | Seasonal apportioning values | | Seasonal abundance values | |
|---|---|---|---|---|
| | **Breeding** | **Non-breeding** | **Breeding** | **Non-breeding** |
| Awel y Môr | 0.057[1] | 0.005 | 89.4 | 14.3 |
| Barrow | 0.057[1] | 0.005 | 2.4 | 0.3 |
| Burbo Bank | No connectivity | 0.005 | - | 0.3 |
| Burbo Bank Extension | No connectivity | 0.005 | - | 7.6 |
| Erebus | No connectivity | 0.005 | - | 138.6 |
| Gwynt y Môr | 0.057[1] | 0.005 | 8.5 | 1.0 |
| Llŷr 1 | No connectivity | 0.005 | - | 63.6 |
| Mona Offshore Wind Project | 0.057 | 0.005 | 240.5 | 18.4 |
| Morecambe Offshore Wind Farm: Generation Assets | 0.057[1] | 0.005 | 363.3 | 40.7 |
| Morgan Generation Assets | 0.116 | 0.005 | 465.6 | 18.7 |
| North Hoyle | 0.057[1] | 0.005 | 2.5 | 0.3 |
| Ormonde | 0.057[1] | 0.005 | 52.0 | 0.3 |
| Robin Rigg | 0.057[1] | 0.005 | 7.8 | 0.4 |
| Twinhub | No connectivity | 0.005 | - | 1.1 |
| Walney 1&2 | 0.057[1] | 0.005 | 9.1 | 1.1 |

| Project | Seasonal apportioning values | | Seasonal abundance values | |
|---|---|---|---|---|
| | **Breeding** | **Non-breeding** | **Breeding** | **Non-breeding** |
| Walney 3 + 4 | 0.116[2] | 0.005 | 484.1 | 9.4 |
| West of Duddon Sands | 0.057[1] | 0.005 | 75.3 | 0.8 |
| West of Orkney | No connectivity | 0.005 | - | 21.5 |
| White Cross | No connectivity | 0.005 | - | 5.2 |
| Annual total | | | | 2,144.2 |

1.5.3.7    In addition to those projects considered in-combination in Table 1.15, consideration is also given to underwater collision impacts associated with the Morlais tidal project. The predicted impact associated with this project apportioned to the Southern Coasts and Calf of Man proposed Ramsar site is 3.6 birds/annum.

1.5.3.8    The total potential in-combination impact (applying a 50% displacement rate and 1% mortality rate to the annual total of 2,144 birds apportioned to the Southern Coasts and Calf of Man proposed Ramsar site; Table 1.15) is 10.7 birds/annum[2]. When the impact from the Morlais project is added this increases to 14.3 birds/annum. This represents a 3.69% increase in the baseline mortality of the guillemot population of the Southern Coasts and Calf of Man proposed Ramsar site. This proposed Ramsar is therefore progressed to Step 2 of the Information to Support an Appropriate Assessment (ISAA).

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[2] Additional scenarios incorporating other displacement and mortality rates are considered below with population modelling outputs presented in Appendix B:.

### Integrity test: Step 2

### Southern Coasts and Calf of Man proposed Ramsar site

#### Guillemot

1.5.3.9     Based on the mean-maximum foraging range +1SD of guillemot (Woodward *et al.,* 2019) from the Southern Coasts and Calf of Man proposed Ramsar site, there are a number of projects within foraging range of guillemot from the proposed Ramsar during the breeding season. In the non-breeding season, there are additional projects within the BDMPS of relevance to the species (Furness, 2015).

1.5.3.10    Table 1.16 presents the seasonal population estimates for those projects for which quantified estimates can be obtained or have been calculated in REP1-010. These values represent the number of guillemot from the Southern Coasts and Calf of Man proposed Ramsar site with apportioning values in the breeding season obtained from project-specific literature where available, or, if unavailable, an apportioning value from a nearby project applied. In the non-breeding season, apportioning values are calculated using data from Furness (2015).

**Table 1.16:  Cumulative abundance for guillemot at the Southern Coasts and Calf of Man proposed Ramsar site for projects considered in-combination in relation to disturbance and displacement from projects.**

[1] Apportioning value assumed to be the same as for the Mona Offshore Wind Project.

[2] Apportioning value assumed to be the same as for the Morgan Generation Assets.

| Project | Seasonal apportioning values | | Seasonal abundance values | |
|---|---|---|---|---|
| | **Breeding** | **Non-breeding** | **Breeding** | **Non-breeding** |
| Awel y Môr | 0.057[1] | 0.005 | 89.4 | 14.3 |
| Barrow | 0.057[1] | 0.005 | 2.4 | 0.3 |
| Burbo Bank | No connectivity | 0.005 | - | 0.3 |
| Burbo Bank Extension | No connectivity | 0.005 | - | 7.6 |
| Erebus | No connectivity | 0.005 | - | 138.6 |
| Gwynt y Môr | 0.057[1] | 0.005 | 8.5 | 1.0 |
| Llŷr 1 | No connectivity | 0.005 | - | 63.6 |
| Mona Offshore Wind Project | 0.057 | 0.005 | 240.5 | 18.4 |
| Morecambe Offshore Wind Farm: Generation Assets | 0.057[1] | 0.005 | 363.3 | 40.7 |
| Morgan Generation Assets | 0.116 | 0.005 | 465.6 | 18.7 |
| North Hoyle | 0.057[1] | 0.005 | 2.5 | 0.3 |
| Ormonde | 0.057[1] | 0.005 | 52.0 | 0.3 |
| Robin Rigg | 0.057[1] | 0.005 | 7.8 | 0.4 |
| Twinhub | No connectivity | 0.005 | - | 1.1 |
| Walney 1&2 | 0.057[1] | 0.005 | 9.1 | 1.1 |

| Project | Seasonal apportioning values | | Seasonal abundance values | |
|---|---|---|---|---|
| | **Breeding** | **Non-breeding** | **Breeding** | **Non-breeding** |
| Walney 3 + 4 | 0.116[2] | 0.005 | 484.1 | 9.4 |
| West of Duddon Sands | 0.057[1] | 0.005 | 75.3 | 0.8 |
| West of Orkney | No connectivity | 0.005 | - | 21.5 |
| White Cross | No connectivity | 0.005 | - | 5.2 |
| Annual total | | | | |
| **Scenario 2: Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms: Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets** | | 888.3 | | |
| **Scenario 3: Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms: Transmission Assets and other relevant projects and plans** | | 2,144.2 | | |

**Scenario 2: Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms: Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets**

1.5.3.11 The total population of birds present at the Morgan Generation Assets and Morecambe Generation Assets apportioned to the guillemot population at the Southern Coasts and Calf of Man proposed Ramsar site is 888.3 birds. The assessment considers the guillemot feature of the proposed Ramsar in relation to potential disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts. An assessment against the proposed Ramsar population is provided in Table 1.17. The blue shading in this matrix indicates where the 1% baseline mortality of the guillemot population at the Southern Coasts and Calf of Man proposed Ramsar site is surpassed. The purple outline indicates the range of displacement and mortality rates considered based on JNCC *et al.* (2022) guidance.

1.5.3.12 The JNCC *et al.* (2022) guidance provides an approach to defining displacement and mortality rate ranges for use in displacement assessments which has been followed in Table 1.17 but also indicates that projects should seek and present emerging sources of empirical evidence to provide support for displacement assessments. The most recent appraisal of displacement rates for guillemot was undertaken by APEM (2022). This review concluded that a displacement rate of 50% and mortality rate of 1% was appropriate for use in relation to displacement assessments being undertaken for the Hornsea Four offshore wind farm. The review suggests that in areas of high abundance, displacement is limited and postulates that this may be due to higher importance of the underlying habitat to birds meaning birds are more likely to tolerate the presence of structures in the area. For areas with low abundance, displacement rates were increased and the review postulates that this may be because birds are able to forage in other areas as competition between birds is reduced. The conclusions drawn in this review have however been questioned (Natural England, 2022b).

1.5.3.13 Monitoring of impacts at projects in the Irish Sea, indicate weak attraction/weak avoidance of auk species (APEM, 2022). The most recent study on displacement at the Beatrice offshore wind farm in the Moray Firth, utilising an approach investigating

the distribution of seabirds in relation to turbine locations, suggested that auk species did not avoid turbines (MacArthur Green, 2023).

**Table 1.17:** **In-combination displacement analysis for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site on an annual basis – (Scenario 2).**

| Guillemot | | Mortality rate (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Displacement rate (%) | 10 | 1 | 2 | 4 | 9 | 18 | 27 | 36 | 44 | 53 | 62 | 71 | 80 | 89 |
| | 20 | 2 | 4 | 9 | 18 | 36 | 53 | 71 | 89 | 107 | 124 | 142 | 160 | 178 |
| | 30 | 3 | 5 | 13 | 27 | 53 | 80 | 107 | 133 | 160 | 187 | 213 | 240 | 266 |
| | 40 | 4 | 7 | 18 | 36 | 71 | 107 | 142 | 178 | 213 | 249 | 284 | 320 | 355 |
| | 50 | 4 | 9 | 22 | 44 | 89 | 133 | 178 | 222 | 266 | 311 | 355 | 400 | 444 |
| | 60 | 5 | 11 | 27 | 53 | 107 | 160 | 213 | 266 | 320 | 373 | 426 | 480 | 533 |
| | 70 | 6 | 12 | 31 | 62 | 124 | 187 | 249 | 311 | 373 | 435 | 497 | 560 | 622 |
| | 80 | 7 | 14 | 36 | 71 | 142 | 213 | 284 | 355 | 426 | 497 | 569 | 640 | 711 |
| | 90 | 8 | 16 | 40 | 80 | 160 | 240 | 320 | 400 | 480 | 560 | 640 | 720 | 799 |
| | 100 | 9 | 18 | 44 | 89 | 178 | 266 | 355 | 444 | 533 | 622 | 711 | 799 | 888 |

1.5.3.14   When considering the evidence-based displacement and mortality rates identified above, the displacement mortality for guillemot surpasses the 1% threshold of baseline mortality of the proposed Ramsar population. However, the total cumulative population calculated in Table 1.16 that underpins the calculations in Table 1.17 is a known over-estimate due to the assumption that all birds present at the Morgan Generation Assets in the breeding season are breeding adults. This is not ecologically valid as it is known that a proportion of the birds present will be immature or sabbatical birds (Furness, 2015; Halley and Harris, 1993). It is however, not possible to distinguish between immature and adult guillemot during aerial surveys and therefore the assumption has been made in the calculations presented in Table 1.17 that all birds present are breeding adults.

1.5.3.15   One potential solution is the use of the adult:immature ratio presented in Furness (2015). Furness (2015) states that for every adult there are 0.74 immatures providing an adult proportion of 0.57. This ratio represents the number of adult and immature guillemots present in a stable population.

1.5.3.16   Furness (2015) provides non-breeding season populations for guillemot in UK western waters. These populations include quantification of the immature component. For those colonies closest to the Morgan Generation Assets (e.g. Rathlin Island SPA), the populations presented assume that 90% of immatures associated with these colonies remain in UK waters in the non-breeding season. These birds are unlikely to move out of UK waters during the breeding season and therefore this would suggest that the application of the correction factor noted above is appropriate and provides a more accurate reflection of the potential impact on guillemot at the Southern Coasts and Calf of Man proposed Ramsar site.

1.5.3.17 Table 1.18 presents an assessment against the proposed Ramsar population incorporating a cumulative abundance corrected for the presence of immature birds using the aforementioned proportion from Furness (2015).

**Table 1.18: In-combination displacement analysis for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site on an annual basis, incorporating consideration of immature birds – (Scenario 2).**

| Guillemot | | Mortality rate (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Displacement rate (%) | 10 | 1 | 1 | 3 | 5 | 11 | 16 | 21 | 27 | 32 | 37 | 43 | 48 | 53 |
| | 20 | 1 | 2 | 5 | 11 | 21 | 32 | 43 | 53 | 64 | 74 | 85 | 96 | 106 |
| | 30 | 2 | 3 | 8 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 |
| | 40 | 2 | 4 | 11 | 21 | 43 | 64 | 85 | 106 | 128 | 149 | 170 | 191 | 213 |
| | 50 | 3 | 5 | 13 | 27 | 53 | 80 | 106 | 133 | 160 | 186 | 213 | 239 | 266 |
| | 60 | 3 | 6 | 16 | 32 | 64 | 96 | 128 | 160 | 191 | 223 | 255 | 287 | 319 |
| | 70 | 4 | 7 | 19 | 37 | 74 | 112 | 149 | 186 | 223 | 261 | 298 | 335 | 372 |
| | 80 | 4 | 9 | 21 | 43 | 85 | 128 | 170 | 213 | 255 | 298 | 340 | 383 | 425 |
| | 90 | 5 | 10 | 24 | 48 | 96 | 144 | 191 | 239 | 287 | 335 | 383 | 431 | 479 |
| | 100 | 5 | 11 | 27 | 53 | 106 | 160 | 213 | 266 | 319 | 372 | 425 | 479 | 532 |

1.5.3.18 When considering the evidence-based displacement and mortality rates identified above, the displacement mortality for guillemot does not surpass the 1% threshold of baseline mortality of the proposed Ramsar population. Based on the approach taken in the integrity test: Step 1 this is not considered to represent an adverse effect on the site integrity of the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site.

**Scenario 3: Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms: Transmission Assets and other relevant projects and plans (Tier 1, Tier 2 and Tier 3)**

1.5.3.19 The total population of birds present at the Morgan Generation Assets and other projects apportioned to the guillemot population at the Southern Coasts and Calf of Man proposed Ramsar site is 2,144.2 birds. The assessment considers the guillemot feature of the proposed Ramsar in relation to potential disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts. An assessment against the proposed Ramsar population is provided in Table 1.19. The blue shading in this matrix indicates where the 1% baseline mortality of the guillemot population at the Southern Coasts and Calf of Man proposed Ramsar site is surpassed. The purple outline indicates the range of displacement and mortality rates considered based on JNCC *et al.* (2022) guidance.

1.5.3.20 The JNCC (2022) guidance provides an approach to defining displacement and mortality rate ranges for use in displacement assessments which has been followed in Table 1.19 but also indicates that projects should seek and present emerging sources of empirical evidence to provide support for displacement assessments. The most

recent appraisal of displacement rates for guillemot was undertaken by APEM (2022) as discussed in paragraph 1.5.3.12.

1.5.3.21    Monitoring of impacts at projects in the Irish Sea, indicate weak attraction/weak avoidance of auk species (APEM, 2022). The most recent study on displacement at the Beatrice offshore wind farm utilising an approach investigating the distribution of seabirds in relation to turbine locations suggested that auk species did not avoid turbines (MacArthur Green, 2023).

**Table 1.19:    In-combination displacement analysis for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site on an annual basis – (Scenario 3).**

| Guillemot | | Mortality rate (%) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Displacement rate (%) | 10 | 2 | 4 | 11 | 21 | 43 | 64 | 86 | 107 | 129 | 150 | 172 | 193 | 214 |
| | 20 | 4 | 9 | 21 | 43 | 86 | 129 | 172 | 214 | 257 | 300 | 343 | 386 | 429 |
| | 30 | 6 | 13 | 32 | 64 | 129 | 193 | 257 | 322 | 386 | 450 | 515 | 579 | 643 |
| | 40 | 9 | 17 | 43 | 86 | 172 | 257 | 343 | 429 | 515 | 600 | 686 | 772 | 858 |
| | 50 | 10.7 | 21 | 54 | 107 | 214 | 322 | 429 | 536 | 643 | 750 | 858 | 965 | 1072 |
| | 60 | 13 | 26 | 64 | 129 | 257 | 386 | 515 | 643 | 772 | 901 | 1029 | 1158 | 1286 |
| | 70 | 15.0 | 30 | 75 | 150 | 300 | 450 | 600 | 750 | 901 | 1051 | 1201 | 1351 | 1501 |
| | 80 | 17 | 34 | 86 | 172 | 343 | 515 | 686 | 858 | 1029 | 1201 | 1372 | 1544 | 1715 |
| | 90 | 19 | 39 | 96 | 193 | 386 | 579 | 772 | 965 | 1158 | 1351 | 1544 | 1737 | 1930 |
| | 100 | 21 | 43 | 107 | 214 | 429 | 643 | 858 | 1072 | 1286 | 1501 | 1715 | 1930 | 2144 |

1.5.3.22    The use of a 50% displacement rate and 1% mortality rate results in an in-combination impact of 10.7 birds/annum. In addition to this impact, consideration is also given to underwater collision impacts associated with the Morlais tidal project. The predicted impact associated with this project apportioned to the Southern Coasts and Calf of Man proposed Ramsar site is 3.6 birds/annum. This provides a total in-combination impact of 14.3 birds/annum. This represents more than a 1% increase (3.69%) in the baseline mortality of the proposed Ramsar population[3].

1.5.3.23    When considering the evidence-based displacement and mortality rates identified above, the displacement mortality for guillemot surpasses the 1% threshold of baseline mortality of the proposed Ramsar population. However, the total cumulative population calculated in Table 1.16 that underpins the calculations in Table 1.19 is a known over-estimate due to the assumption that all birds present at the Morgan Generation Assets in the breeding season are breeding adults. This is not ecologically valid as discussed in paragraph 1.5.3.14 to 1.5.3.16.

1.5.3.24    Table 1.18 presents an assessment against the proposed Ramsar population incorporating a cumulative abundance corrected for the presence of immature birds using the aforementioned proportion from Furness (2015).

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[3] Additional scenarios incorporating other displacement and mortality rates are considered below with population modelling outputs presented in Appendix B:

**Table 1.20:** In-combination displacement analysis for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site on an annual basis, incorporating consideration of immature birds – (Scenario 3).

| Guillemot | Mortality rate (%) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 10 | 1 | 3 | 7 | 14 | 27 | 41 | 55 | 68 | 82 | 96 | 110 | 123 | 137 |
| 20 | 3 | 5 | 14 | 27 | 55 | 82 | 110 | 137 | 164 | 192 | 219 | 247 | 274 |
| 30 | 4 | 8 | 21 | 41 | 82 | 123 | 164 | 205 | 247 | 288 | 329 | 370 | 411 |
| 40 | 5 | 11 | 27 | 55 | 110 | 164 | 219 | 274 | 329 | 384 | 438 | 493 | 548 |
| 50 | 6.8 | 14 | 34 | 68 | 137 | 205 | 274 | 342 | 411 | 479 | 548 | 616 | 685 |
| 60 | 8 | 16 | 41 | 82 | 164 | 247 | 329 | 411 | 493 | 575 | 658 | 740 | 822 |
| 70 | 10 | 19 | 48 | 96 | 192 | 288 | 384 | 479 | 575 | 671 | 767 | 863 | 959 |
| 80 | 11 | 22 | 55 | 110 | 219 | 329 | 438 | 548 | 658 | 767 | 877 | 986 | 1096 |
| 90 | 12 | 25 | 62 | 123 | 247 | 370 | 493 | 616 | 740 | 863 | 986 | 1110 | 1233 |
| 100 | 14 | 27 | 68 | 137 | 274 | 411 | 548 | 685 | 822 | 959 | 1096 | 1233 | 1370 |

(Displacement rate (%) — row labels at left)

1.5.3.25 The use of a 50% displacement rate and 1% mortality rate results in an in-combination impact of 6.8 birds/annum. In addition to this impact, consideration is also given to underwater collision impacts associated with the Morlais tidal project. The predicted impact associated with this project apportioned to the Southern Coasts and Calf of Man proposed Ramsar site is 2.1 birds/annum. This provides a total in-combination impact of 8.9 birds/annum. This represents more than a 1% increase (2.30%) in the baseline mortality of the proposed Ramsar population.

1.5.3.26 In addition to immature birds, sabbatical birds are also likely to be present at the Morgan Generation Assets. Horswill and Robinson (2015) suggests that 7.9% of birds present are sabbatical birds with this value considered to be of good quality and good representation as part of the study. Table 1.21 presents an assessment against the proposed Ramsar population incorporating a cumulative abundance corrected for the presence of immature and sabbatical birds.

**Table 1.21:** In-combination displacement analysis for the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site on an annual basis, incorporating consideration of immature and sabbatical birds – (Scenario 3).

| Guillemot | Mortality rate (%) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 10 | 1 | 3 | 6 | 13 | 26 | 39 | 52 | 64 | 77 | 90 | 103 | 116 | 129 |
| 20 | 3 | 5 | 13 | 26 | 52 | 77 | 103 | 129 | 155 | 180 | 206 | 232 | 258 |
| 30 | 4 | 8 | 19 | 39 | 77 | 116 | 155 | 193 | 232 | 271 | 309 | 348 | 387 |
| 40 | 5 | 10 | 26 | 52 | 103 | 155 | 206 | 258 | 309 | 361 | 412 | 464 | 516 |
| 50 | 6.4 | 13 | 32 | 64 | 129 | 193 | 258 | 322 | 387 | 451 | 516 | 580 | 644 |
| 60 | 8 | 15 | 39 | 77 | 155 | 232 | 309 | 387 | 464 | 541 | 619 | 696 | 773 |

(Displacement rate (%) — row labels at left)

| Guillemot | Mortality rate (%) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 70 | 9 | 18 | 45 | 90 | 180 | 271 | 361 | 451 | 541 | 631 | 722 | 812 | 902 |
| 80 | 10 | 21 | 52 | 103 | 206 | 309 | 412 | 516 | 619 | 722 | 825 | 928 | 1031 |
| 90 | 12 | 23 | 58 | 116 | 232 | 348 | 464 | 580 | 696 | 812 | 928 | 1044 | 1160 |
| 100 | 13 | 26 | 64 | 129 | 258 | 387 | 516 | 644 | 773 | 902 | 1031 | 1160 | 1289 |

1.5.3.27    The use of a 50% displacement rate and 1% mortality rate results in an in-combination impact of 6.4 birds/annum. In addition to this impact, consideration is also given to underwater collision impacts associated with the Morlais tidal project. The predicted impact associated with this project apportioned to the Southern Coasts and Calf of Man proposed Ramsar site is 1.9 birds/annum. This provides a total in-combination impact of 8.4 birds/annum. This represents more than a 1% increase (2.15%) in the baseline mortality of the proposed Ramsar population.

1.5.3.28    As the predicted impacts surpass the 1% threshold of baseline mortality, PVA modelling has been conducted incorporating the impact input values presented in Table 1.22. In addition to those scenarios presented in Table 1.22, additional impact scenarios calculated using different displacement and mortality rates are presented in Appendix A: and Appendix B:.

**Table 1.22:  Predicted impact scenarios for guillemot from the Southern Coasts and Calf of Man proposed Ramsar site due to displacement impacts associated with the Morgan Generation Assets.**

| Impact scenario | Potential impact (no. of birds) | Increase in baseline mortality (%) | Impact on adult survival rate |
|---|---|---|---|
| All birds are breeding adults | 14.0 | 3.60 | 0.00225050 |
| Exclusion of immatures | 8.6 | 2.21 | 0.00140314 |
| Exclusion of immature and sabbaticals | 8.0 | 2.07 | 0.00131441 |

1.5.3.29    PVA outputs for each of the scenarios identified in Table 1.22 are presented in Table 1.23.

**Table 1.23:   PVA outputs for the annual impact on guillemot from the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets.**

Notes:

CGR = Counterfactual of Growth Rate

CPS = Counterfactual of Population Size

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|------|-----------------|---------------------------|------------------------------|--------------------|------------------------------------------------|------------------------------------------------|------------|------------|
| 2030 | Baseline (unimpacted) | 8,800 | 2.7 | 1.027 | 0.954 | 1.098 | | |
| 2030 | All birds are breeding adults | 8,777 | 2.5 | 1.025 | 0.951 | 1.095 | 0.998 | 0.997 |
| 2030 | Inclusion of immatures | 8,789 | 2.5 | 1.025 | 0.952 | 1.097 | 0.999 | 0.999 |
| 2030 | Inclusion of immature and sabbaticals | 8,781 | 2.6 | 1.026 | 0.952 | 1.096 | 0.999 | 0.999 |
| 2065 | Baseline (unimpacted) | 21,537 | 151.5 | 1.026 | 1.017 | 1.035 | | |
| 2065 | All birds are breeding adults | 19,646 | 129.9 | 1.023 | 1.014 | 1.032 | 0.997 | 0.913 |
| 2065 | Inclusion of immatures | 20,335 | 137.5 | 1.024 | 1.015 | 1.033 | 0.998 | 0.945 |
| 2065 | Inclusion of immature and sabbaticals | 20,415 | 138.5 | 1.024 | 1.015 | 1.033 | 0.999 | 0.948 |

1.5.3.30   When assuming that all birds are breeding adults, the model predicts a median counterfactual of growth rate of 0.997 after 35 years identical to that predicted at the onset of impacts as incorporated into the modelling approach. Under this impact scenario, the predicted counterfactual median impacted population size would be approximately 129.9% larger compared to that which the model predicts would occur in the absence of any additional impact after 35 years. As the predicted growth rate is positive the predicted simulated population size is greater than at the start of the modelling period. This indicates that a slowing of the population growth rate, albeit by only 0.3%, rather than a population decline, is likely as a result of in-combination impacts. The trends observed in these outputs also occur when more conservative displacement and mortality rates are considered (e.g. a 70% displacement rate and 2% mortality rate) (Appendix B:). The only impact scenario that results in a slight decrease in the population of guillemot at the Southern Coasts and Calf of Man proposed Ramsar site (-5.8% after 35 years) is that associated with a 70% displacement rate and 10% mortality rate when assuming that all birds are breeding adults. This scenario is entirely unrealistic from a displacement and mortality rate

perspective (see paragraphs 1.5.3.6 to 1.5.3.24 in HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments (APP-098) for an explanation as to why) and is not ecologically valid based on the assumption that immature and sabbatical are not present in the impacted population (as discussed in paragraphs 1.5.3.23 to 1.5.3.24 and 1.5.3.26). This scenario is therefore not considered further in this assessment.

1.5.3.31    When more realistic impact scenarios, incorporating immature and sabbatical birds, are considered, the predicted in-combination impact results in negligible changes in the PVA output metrics including a reduction of only 0.2% in the predicted growth rate.

1.5.3.32    The population of guillemot at the Southern Coasts and Calf of Man proposed Ramsar site has increased between the Seabird 2000 national census when 5,570 breeding adults were present, and the Seabirds Count national census, when 6,362 breeding adults were present. This represents an annual growth rate of 0.79%. This empirical annual average growth rate is higher than predicted by the PVA. Given the PVA is predicting a continuation of the increasing population, the predicted impact can be considered to be of negligible magnitude.

1.5.3.33    As the PVA modelling undertaken for common guillemot from the Southern Coasts and Calf of Man proposed Ramsar site indicate an increasing population size with and without the predicted impacts, it can be concluded that there is no adverse effect on the integrity of the site, beyond reasonable scientific doubt, when considering impacts from the Morgan Generation Assets in-combination with other plans and projects. This conclusion also applies to impact scenarios calculated using displacement and mortality rates of 30 and 1% and 70 and 2% with PVA outputs for these scenarios presented in Appendix B:. The population at the Ramsar would also continue to increase when assuming an impact scenario associated with a displacement rate of 70% and mortality rate of 10% but only when accounting for immature birds and immature and sabbatical birds. When it is assumed that all birds are breeding adult birds the population at the Ramsar would decrease. However, as discussed above this is not considered to be a realistic scenario as there is significant over-estimation associated with the displacement and mortality rates applied and the assumption that all birds present are breeding adult birds.

1.5.3.34    There are no conservation objectives for Ramsar sites or proposed Ramsar sites and therefore no comparisons can be made however, it is considered based on the information presented in this assessment, conservation objectives defined for comparable designated sites and the assessment conclusions reached for those sites, that any conservation objectives to be proposed for the Ramsar sites would not be undermined by the impacts associated with the Morgan Generation Assets in-combination with other plans and projects.

## 1.6      Conclusion

1.6.1.1    As outlined in paragraph 1.1.1.3, the information presented in this note has been provided to support an appropriate assessment should one be required to be undertaken by the Competent Authority for the five proposed Ramsar sites on the Isle of Man. The Applicant notes that this information has not been requested pre-application or post-application by any stakeholder or Interested Party in the Morgan Generation Assets Examination. The IoM Government TSC, when responding to ISH2 Action Point 19 (REP4-039), have also confirmed that "*We are therefore content that an appropriate view has been given to these colonies within the Statement, which indicates no LSE and therefore concur with the Applicant's response to ExQ1 MO1.17*".

1.6.1.2       The assessment of the Isle of Man proposed Ramsar sites considered the potential for LSE on offshore ornithological features of these sites.

1.6.1.3       The HRA Stage 1 screening (see section 1.4) concluded that there was the potential for LSE for the common guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar as a result of the impacts associated with the Morgan Generation Assets in-combination with other plans and projects and therefore this site was taken forward to appropriate assessment in section 1.5

1.6.1.4       The in-combination assessments predicted an increase in baseline mortality of >1% and therefore further detailed assessment was undertaken to investigate the potential impact. This detailed assessment, which included population modelling, concluded that there was no AEoI on the guillemot feature of the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets in-combination with other plans and projects.

# 1.7 References

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# Appendix A: PVA input logs

# PVA run 1

## A.1 Set up

The log file was created on: 2025-01-13 12:27:45 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"
```

## A.2 Basic information

This run had reference name "GU_proposed Ramsar_Incombo".
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: 15.
Years for burn-in: 5.
Case study selected: None.

## A.3 Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: National. 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.

### A.3.1 Population 1

**Initial population values:** Initial population 6362 in 2017

**Productivity rate per pair:** mean: 0.583 , sd: 0.075

**Adult survival rate:** mean: 0.94 , sd: 0.025

**Immatures survival rates:**

Age class 0 to 1 - mean: 0.56 , sd: 0.058 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.152 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098 , DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107 , DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

# A.4      Impacts

Number of impact scenarios: 9.

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

## A.4.1      Impact on Demographic Rates

### A.4.1.1      Scenario A - Name: Full_impact_501

**All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.0022505 , se: NA

### A.4.1.2      Scenario B - Name: Excl_immatures__501

**All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00140314 , se: NA

### A.4.1.3      Scenario C - Name: Excl_sabbaticals_501

**All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00131441 , se: NA

### A.4.1.4      Scenario D - Name: Full_impact_702

**All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00528358  , se: NA

### A.4.1.5 Scenario E - Name: Excl_immatures__702

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00334092 , se: NA

### A.4.1.6 Scenario F - Name: Excl_sabbaticals_702

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00313748 , se: NA

### A.4.1.7 Scenario G - Name: Full_impact_7010

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.0241561 , se: NA

### A.4.1.8 Scenario H - Name: Excl_immatures__7010

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.01539818 , se: NA

### A.4.1.9 Scenario I - Name: Excl_sabbaticals_7010

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.01448104 , se: NA

## A.5 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

# PVA run 2

## A.6        Set up

The log file was created on: 2025-01-13 12:51:57 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"
```

## A.7        Basic information

This run had reference name "GU_proposed Ramsar_Incombo_301".
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: 15.
Years for burn-in: 5.
Case study selected: None.

## A.8        Baseline demographic rates

Species chosen to set initial values: Common Guillemot.
Region type to use for breeding success data: .
Available colony-specific survival rate: National. 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.

### A.8.1        Population 1

**Initial population values:** Initial population 6362 in 2017

**Productivity rate per pair:** mean: 0.583 , sd: 0.075

**Adult survival rate:** mean: 0.94 , sd: 0.025

**Immatures survival rates:**

Age class 0 to 1 - mean: 0.56 , sd: 0.058 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.152 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098 , DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107 , DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

# A.9    Impacts

Number of impact scenarios: 9.

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

## A.9.1    Impact on Demographic Rates

### A.9.1.1    Scenario A - Name: Full_impact_301

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00157648 , se: NA

### A.9.1.2    Scenario B - Name: Excl_immatures__301

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00097253 , se: NA

### A.9.1.3    Scenario C - Name: Excl_sabbaticals_301

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00090928 , se: NA

# A.10    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

# Appendix B: PVA outputs for other impact scenarios

**Table 1.24:** **PVA outputs for the annual impact on guillemot from the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets (Displacement rate = 30%, mortality rate = 1%).**

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|---|---|---|---|---|---|---|---|---|
| 2030 | Baseline (unimpacted) | 8,798 | 2.7 | 1.027 | 0.953 | 1.098 | | |
| 2030 | All birds are breeding adults | 8,794 | 2.5 | 1.025 | 0.952 | 1.095 | 0.998 | 0.998 |
| 2030 | Inclusion of immatures | 8,789 | 2.6 | 1.026 | 0.953 | 1.097 | 0.999 | 0.999 |
| 2030 | Inclusion of immature and sabbaticals | 8,785 | 2.6 | 1.026 | 0.952 | 1.097 | 0.999 | 0.999 |
| 2065 | Baseline (unimpacted) | 21,553 | 151.8 | 1.026 | 1.017 | 1.035 | | |
| 2065 | All birds are breeding adults | 20,196 | 136.0 | 1.024 | 1.015 | 1.033 | 0.998 | 0.939 |
| 2065 | Inclusion of immatures | 20,653 | 141.9 | 1.025 | 1.016 | 1.034 | 0.999 | 0.961 |
| 2065 | Inclusion of immature and sabbaticals | 20,781 | 142.2 | 1.025 | 1.016 | 1.034 | 0.999 | 0.964 |

**Table 1.25:** **PVA outputs for the annual impact on guillemot from the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets (Displacement rate = 70%, mortality rate = 2%).**

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|---|---|---|---|---|---|---|---|---|
| 2030 | Baseline (unimpacted) | 8,800 | 2.7 | 1.027 | 0.954 | 1.098 | | |
| 2030 | All birds are breeding adults | 8,745 | 2.1 | 1.021 | 0.949 | 1.091 | 0.995 | 0.994 |

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|------|-----------------|---------------------------|------------------------------|--------------------|--------------------------------------------------|---------------------------------------------------|------------|------------|
| 2030 | Inclusion of immatures | 8,766 | 2.3 | 1.023 | 0.951 | 1.093 | 0.997 | 0.996 |
| 2030 | Inclusion of immature and sabbaticals | 8,768 | 2.4 | 1.024 | 0.950 | 1.094 | 0.997 | 0.997 |
| 2065 | Baseline (unimpacted) | 21,537 | 151.5 | 1.026 | 1.017 | 1.035 | | |
| 2065 | All birds are breeding adults | 17,401 | 103.4 | 1.020 | 1.011 | 1.029 | 0.994 | 0.809 |
| 2065 | Inclusion of immatures | 18,829 | 119.8 | 1.022 | 1.013 | 1.031 | 0.996 | 0.874 |
| 2065 | Inclusion of immature and sabbaticals | 18,971 | 121.9 | 1.022 | 1.013 | 1.031 | 0.996 | 0.881 |

**Table 1.26:** **PVA outputs for the annual impact on guillemot from the Southern Coasts and Calf of Man proposed Ramsar site from the Morgan Generation Assets (Displacement rate = 70%, mortality rate = 10%).**

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|------|-----------------|---------------------------|------------------------------|--------------------|--------------------------------------------------|---------------------------------------------------|------------|------------|
| 2030 | Baseline (unimpacted) | 8,800 | 2.7 | 1.027 | 0.954 | 1.098 | | |
| 2030 | All birds are breeding adults | 8,574 | 0.1 | 1.001 | 0.927 | 1.069 | 0.974 | 0.975 |
| 2030 | Inclusion of immatures | 8,661 | 1.0 | 1.010 | 0.937 | 1.080 | 0.984 | 0.984 |
| 2030 | Inclusion of immature and sabbaticals | 8,664 | 1.1 | 1.011 | 0.939 | 1.081 | 0.985 | 0.985 |
| 2065 | Baseline (unimpacted) | 21,537 | 151.5 | 1.026 | 1.017 | 1.035 | | |
| 2065 | All birds are breeding adults | 8,050 | -5.8 | 0.998 | 0.989 | 1.007 | 0.973 | 0.374 |

| Year | Impact scenario | Simulated population size | Median population change (%) | Median growth rate | Lower confidence limit of simulated growth rate | Upper confidence limit of simulated growth rate | Median CGR | Median CPS |
|------|-----------------|---------------------------|------------------------------|--------------------|--------------------------------------------------|--------------------------------------------------|------------|------------|
| 2065 | Inclusion of immatures | 11,541 | 35.0 | 1.008 | 0.999 | 1.017 | 0.983 | 0.536 |
| 2065 | Inclusion of immature and sabbaticals | 12,008 | 40.1 | 1.009 | 1.000 | 1.018 | 0.984 | 0.557 |