# Conservation and Management Advice

## FAIR ISLE SPA

## UK SITE: 9002091

*DECEMBER 2024*

This document provides advice to Public Authorities and stakeholders about the activities that may affect the protected features of Fair Isle Special Protection Area (SPA). It provides advice from Scottish Natural Heritage (SNH) (operating under the name of and hereinafter referred to as NatureScot) under Regulation 33(2) of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) to other relevant authorities on the Conservation Objectives for the Fair Isle SPA, and any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the site has been designated. It covers a range of different activities and developments but is not exhaustive. It focuses on where there is a risk to achieving the Conservation Objectives. The paper does not attempt to cover all possible future activities or eventualities (e.g. as a result of accidents) and does not consider cumulative effects.

Further information on marine protected areas and management is available at -

https://www.gov.scot/policies/marine-environment/marine-protected-areas/

For the full range of MPA site documents and more on the fascinating range of marine life to be found in Scotland's seas, please visit -

www.nature.scot/mpas or https://jncc.gov.uk/advice/marine-protected-areas/

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## Contents

# 1 Overview of document

This document provides details of the Conservation and Management Advice for the Fair Isle Special Protection Area (SPA) and it is divided into eight main sections. The introduction in section 2 gives an overview of the Fair Isle SPA and its contribution in terms of conservation and wider benefits. Section 3 provides an overview of the roles of the various bodies involved with advising, regulating and managing the SPA. Section 4 describes the protected features and their condition, and section 5 introduces the Conservation Objectives for the site. Section 6 describes the threats and pressures to which the protected features are sensitive, and section 7 provides the management advice for these activities. Section 8 identifies what further research and surveys may be required to increase our understanding of how the protected features utilise the marine protected area.

Annex 1 sets out the Fair Isle SPA Conservation Objectives. Annex 2 provides supporting information relating to the protected features.

Throughout this document the term Special Protection Area (SPA) is used in relation to the site name, e.g. Fair Isle SPA or in discussion of the specific legislation relating to the site. Otherwise the term Marine Protected Area (MPA) is used when discussing the MPA network generally. The term *qualifying features* is used in the Conservation Objectives to refer to those Annex 1 and regularly occurring migratory bird species that the Fair Isle SPA has specifically been designated to protect. Within the wider document text, the term *protected features* is used to refer both to these specific site features and more generally to species or habitats protected through SPA designations.

# 2 Introduction

## *2.1 Purpose statement*

The Fair Isle SPA has been designated to protect ten species of breeding seabirds, a breeding seabird assemblage, the Fair Isle wren, and their supporting habitats. By doing so it contributes to the Scottish, UK and OSPAR MPA networks, the conservation of the wider marine environment around Scotland, and progress towards Good Environmental Status within the North-East Atlantic marine region.

The main purpose of the Fair Isle SPA is to contribute towards the Favourable Conservation Status of the protected features in the Marine Atlantic Biogeographic Region. The Conservation Objectives form the framework for establishing appropriate management measures and assessing all future plans and projects that have the potential to affect the protected features of the SPA.

## *2.2 Conservation benefits*

The conservation benefits for the Fair Isle SPA are:

- Protecting the endemic species of Fair Isle wren (an Annex 1 rare and vulnerable species), contributing 100% (approximately 33 territorial males) of the global population.
- Protecting important numbers of Arctic tern (an Annex 1 rare and vulnerable species), contributing around 1% (approximately 1,100 pairs) of GB population.
- Protecting internationally important numbers of guillemot, contributing around 1.4% of the north Atlantic biogeographic population (approximately 32,300 individuals).
- Protecting internationally important numbers of seabirds during the breeding season including, puffin (2% of the GB population), razorbill (2% of the GB population), kittiwake (4% of the GB population), great skua (1% of the GB population, Arctic skua (3% of the

GB population), shag (3% of the GB population), gannet, fulmar (7% of the GB population, guillemot and Arctic tern.
- Protecting important waters immediately surrounding the seabird-breeding colony, which the seabird protected features use for resting, preening and other maintenance activities, as well as for feeding.
- Protecting important moorland, grassland and rocky coastline habitats which the Fair Isle wren can use for nesting and foraging.

### *2.3 Wider benefits*

The protected features of the Fair Isle SPA provide ecosystem services locally and to the wider marine ecosystem. We describe these ecosystem services in terms of their functions (the support or provision of something to the wider ecosystem e.g. habitat, nutrient cycling, sediment stabilisation) and natural resources (e.g. fish and shellfish, aggregates, wildlife), which in turn lead to benefits for people.

Figure 1 illustrates how the protected features of the Fair Isle SPA contribute to benefits for people. There can be many complex interactions and dependencies amongst the protected features, their functions, associated natural resources and the benefits we gain from them.

The protected features, especially when taken within the context of the whole SPA and/or local ecosystem, contribute to certain functions more than others, e.g. biomass production and nutrient cycling and are fundamental to the continued supply of natural resources and benefits associated with this MPA, and to the long-term health of the protected features.

In terms of resources, the SPA comprises a rich diversity of cliff, moorland and marine habitats. The SPA encompasses the cliffs, moorland and nearshore waters (out to around 2 km) surrounding the island. The diverse marine habitats support a variety of natural resources, including molluscs, crustaceans, marine worms, pelagic and demersal fish species together with the birds that feed on them. A diversity of vegetation types, with variable maritime influence, occurs, from vegetated sea cliffs, through coastal grassland to heather moorland. The SPA habitats support large concentrations of breeding seabirds as well as breeding Fair Isle wren. The island is one of only four UK sites defined as Key Sites for seabird monitoring (JNCC long-term monitoring sites).

The rich and varied natural resources present within the SPA give rise to a wide range of benefits to people. The seascapes and wildlife within the SPA provide opportunities for tourism, recreation, and wildlife watching (with Fair Isle Bird Observatory established on the isle). Fisheries and supporting businesses from local communities within and around the SPA utilise and benefit from the wildlife and the area's fish and shellfish resources. Further benefits relating to health and well-being, food and nutrition also arise from the site's natural resources, resulting in a place where the community and visitors can spend time connecting with and enjoying nature. The establishment of Fair Isle Demonstration and Research MPA presents further opportunities for research, study and wider community benefits.

The benefits that arise from the functions and natural resources of the MPA are typically small in the context of the whole of Scotland, but some are of greater importance for this MPA and the people that use it. There is potential for benefits to be enhanced by improving the quantity or quality (health) of the protected features themselves.

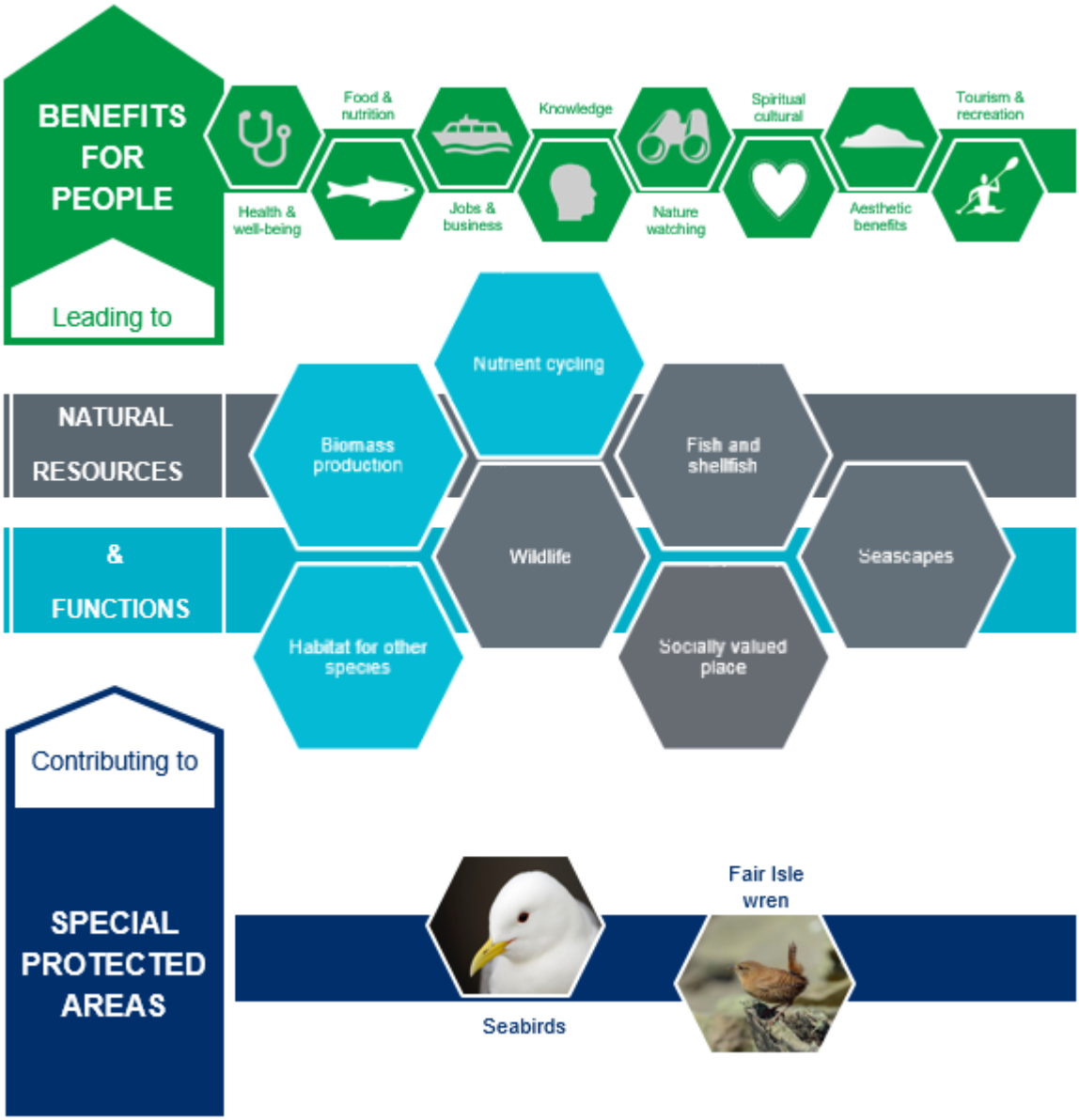


**Figure 1. Benefits to people associated with protected features of the Fair Isle SPA.**

### *2.4 Contribution to policy commitments*

Managing the Fair Isle SPA to maintain the protected features in favourable condition, will ensure the continued provision of the benefits above as well as the SPA's contribution to:

- An ecologically coherent network of MPAs which are well managed under the OSPAR convention and national legislation.
- Achieving Favourable Conservation Status for the protected features in the Atlantic Biogeographic Region.
- Progress towards achieving Good Environmental Status in relation to maintaining biological diversity, and ensuring marine food web abundance and diversity.
- Making a significant contribution to the protection, enhancement and health of the marine area under the National Marine Plan.
- Restoring marine and coastal ecosystems and increasing the environmental status of our seas under the Scottish Biodiversity Strategy.

- Helping to adapt to climate change under The Scottish Climate Change Adaptation Programme.

## 3 Roles

This document provides advice for Fair Isle SPA in relation to activities that may affect the protected features. More detailed advice can be provided to relevant authorities to inform their decision making as required. In doing this, our aim is to ensure the Conservation Objectives for the protected features are met.

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) (the "Habitats Regulations") under Regulation 33(2), make special provisions for the protection of European marine sites, requiring SNH (now referred to as NatureScot), to advise other relevant authorities of the Conservation Objectives for a site, and also of the operations which may cause deterioration of the habitats or species, or disturbance of species protected in the SPA.

It is the role of the relevant and competent authorities[1] to ensure that the activities they regulate, permit or license do not hinder the achievement of the Conservation Objectives of the Fair Isle SPA. The management advice in this document is provided to assist authorities in managing the activities outlined in section 7 and undertaking Habitats Regulations Appraisals of plans and projects.

Stakeholders can provide additional evidence to support the development of management including local knowledge of the environment and of activities. This will contribute to the development of well-designed and effective management measures.

## 4 Protected features and status

The Fair Isle SPA has been selected to become part of the UK's SPA network, contributing to Scotland's MPA network, which in turn has been established to help conserve and recover a range of Scotland's important marine habitats, wildlife, geology and landforms.

The protected features of the Fair Isle SPA are protected within the SPA throughout the year, irrespective of the season for which they qualified as a protected feature.

Table 1 provides a summary of the protected features within the SPA, their condition within the site (where known) based on the latest NatureScot Site Condition Monitoring assessment, and the broader conservation status of the protected features. Current trends for relevant seabird colonies can be found in JNCC (2021) and is based on trends derived from the Seabird Monitoring Programme (SMP) including, where available, Seabird Counts census data (Burnell *et al*. 2023). Where the SMP data is more recent than the SCM data this has been used to inform the feature condition at the site.

[1] A relevant authority is a body or authority that has a function in relation to land or waters within or adjacent to the site (Regulation 5) and include: a nature conservation body; a local authority; water undertakers; a navigation authority; a harbour authority; a lighthouse authority; a river purification board (SEPA); a district salmon fishery board; and a local fisheries committee. All relevant authorities are competent authorities. A competent authority is defined in Regulation 6 as "any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office". In the context of a plan or project, the competent authority is the authority with the power or duty to determine whether or not the proposal can proceed.

**Table 1. Protected features and status for the Fair Isle SPA.**
Feature condition refers to the condition of the protected feature at a site level. Broader conservation status is the overall conservation status of the feature within the UK and Europe. No assessment on the condition of the feature at the Marine Atlantic Biogeographic Region scale is available.

| Protected Feature | Feature condition at site | Assessment year | Broader conservation status | |
|---|---|---|---|---|
| | | | UK[2] | European region[3] |
| Arctic skua (breeding) | Unfavourable, no change | 2023 | Red | Endangered |
| Arctic tern (breeding) | Unfavourable, recovering | 2023 | Red | Least concern |
| Atlantic puffin (breeding) | Unfavourable, No change | 2015 | Red | Endangered |
| Black-legged kittiwake (breeding) | Unfavourable, Declining | 2021 | Red | Vulnerable |
| Common guillemot (breeding) | Unfavourable, No change | 2021 | Amber | Least concern |
| European shag (breeding) | Unfavourable, Declining | 2021 | Amber | Least concern |
| Fair Isle wren (breeding) | Favourable, Maintained | 2012 | Not assessed | Not assessed |
| Great skua (breeding) | Favourable, maintained | 2023 | Red | Least concern |
| Northern fulmar (breeding) | Favourable, maintained | 2021 | Amber | Vulnerable |
| Northern gannet (breeding) | Favourable, Maintained | 2023 | Amber | Least concern |
| Razorbill (breeding) | Unfavourable, No change | 2021 | Amber | Least concern |

[2] Based on Birds of Conservation Concern 5 (BoCC5), for further details on definitions see Stanbury *et al.* 2024.
[3] Based on BirdLife International, 2021

## 5 Setting Conservation Objectives

### *5.1 Background*

Under Regulation 33(2) of the Habitats Regulations, NatureScot have responsibility for providing the Conservation Objectives for European marine sites in Scottish territorial waters. These site-level Conservation Objectives seek to define the contribution that each SPA should make to achieving Favourable Conservation Status for the protected features. They provide the framework for the setting of site conservation measures (management) and for the Habitats Regulations Appraisal of projects and plans.

Annex 1 sets out the Conservation Objectives for the Fair Isle SPA.

### *5.2 Relationship between feature condition and Conservation Objectives*

The Conservation Objectives seek to *maintain* protected SPA features where evidence exists that a feature is in favourable condition in the site, or where there is uncertainty concerning the assessed condition of a feature (see section 4) but no reason to suspect deterioration in condition since designation. Where evidence exists that a feature is declining and/or damaged and therefore not in a favourable condition in the site, the Conservation Objectives will seek to *restore* the protected feature.

The following protected features are in favourable condition at the Fair Isle SPA: Fair Isle wren, great skua, gannet and fulmar. Therefore, the Conservation Objectives seek to *maintain* this condition.

The following protected features are in unfavourable condition at the Fair Isle SPA: Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag and razorbill. Therefore, the Conservation Objectives seek to *restore* this condition.

Breeding Arctic skua are in unfavourable condition at the Fair Isle SPA due to a decline of 80% from 110 (1994 citation) to 22 pairs (2023 count). The reasons for decline are not clear, but is likely to be due to off-site factors such as changes in prey availability within the marine environment. Competition with and predation by great skua may also be a contributing factor at Fair Isle SPA.

Breeding Arctic tern are in unfavourable condition at the Fair Isle SPA due to a decline of 73% from 1100 pairs (1994 citation) to 295 pairs (2023, minimum count). Arctic tern populations can fluctuate markedly from year to year and colonies are known to move *en masse* between different sites. The decline of Arctic tern at Fair Isle SPA is thought to be mainly due to offsite factors such as changing prey availability (especially sandeels).

Breeding puffin are in unfavourable condition at the Fair Isle SPA due to a decline of 71% from 23,000 individuals (1994 citation) to 6,666 individuals (2015 count). The decline of Atlantic puffin tern at Fair Isle SPA is thought to be mainly due to offsite factors such as changing prey availability (especially sandeels).

Breeding kittiwake are in unfavourable condition at the Fair Isle SPA due to a decline of 97% from 18,160 pairs (1994 citation) to 448 pairs (2021 count). The reasons for declines of kittiwakes at this SPA are uncertain, however reduction of prey in their foraging areas (off-colony factors) is considered a key contributing factor. Kittiwake breeding success was found to be related to sandeel abundance and availability (e.g. Daunt *et al.* 2008; Poloczanska *et al.* 2004). At the Fair Isle SPA competition with and predation by great skua may also be a contributing factor.

Breeding guillemot are in unfavourable condition at Fair Isle SPA due to a decline of 43% from 32,300 individuals (1994 citation) to 18,295 individuals (2021 count). The reasons for the decline are uncertain. Off-colony factors such as reduction in prey in foraging areas may be contributing to the decline.

Breeding shag are in unfavourable condition at Fair Isle SPA due to a decline of 91% from 1,100 pairs (1994 citation) to 94 pairs (2021 count). The reasons for the decline are uncertain but are potentially associated with poor weather conditions (shags are prone to large population crashes 'wrecks' as a result of extreme weather events) and off-colony factors such as reduction in prey in foraging areas. Studies have demonstrated factors relating to prey availability (including sandeel and saithe) correlate with breeding success (e.g. Bustnes *et al.* 2013).

Breeding razorbill are in unfavourable condition at the Fair Isle SPA due to a decline of 43% from 3,400 individuals (1994 citation) 1,925 individuals (2021 count). The reasons for declines of razorbills at this SPA are uncertain however reduction of prey in their foraging areas is considered a key contributing factor. No loss or deterioration of suitable nesting habitat (sea-cliffs) has been noted at Fair Isle SPA.

### *5.3 Conservation priorities*

On the rare occasion where the need to favour the management of one protected feature of a site over another, conservation priority will be given to the most important species/habitats to take action for and/or the most important or urgent measures to be taken.

For the Fair Isle SPA, Fair Isle wren and Arctic tern are Annex 1 species and considered rare and vulnerable. The conservation requirements for Annex 1 species should take precedence over the regularly occurring migratory species (the remaining seabirds).

There are currently no apparent management conflicts between the protected features within the Fair Isle SPA. However, given the interactions between predatory great skuas and the other seabird protected features, should future conservation measures be proposed to enhance the population of great skuas, impacts on other protected features will need full consideration.

### *5.4 Overlapping Protected Areas*

The following protected area boundaries overlap with, or are immediately adjacent to the Fair Isle SPA:

- Fair Isle Site of Special Scientific Interest (SSSI)
- Fair Isle Special Area of Conservation (SAC)
- Fair Isle MPA (Demonstration and Research)
- Shetland National Scenic Area (NSA)

Conservation measures in the overlapping protected areas need to ensure the Conservation Objectives of all the sites are met. Priority would be given to the SPA/SAC features.

There are no apparent management conflicts between the protected features of the Fair Isle SPA and the protected features of the other overlapping protected areas.

Site information including the Conservation Objectives for the protected areas overlapping Fair Isle SPA are available on SiteLink.

## 6 Feature sensitivity

The following section provides an overview of the pressures associated with human activities that are most relevant to the protected features. Further information on feature sensitivity, will be made available on Marine Scotland's Feature Activity Sensitivity Tool (FeAST)[4]. The information in FeAST will reflect our current understanding of the interactions between activities, pressures and features. It highlights that activities can give rise to a range of pressures, which the protected features may be sensitive to. Our assessment of sensitivity is based on a feature's tolerance (response to change) and its ability to recover.

### *6.1 Arctic tern (breeding)*

Terns are potentially sensitive to bycatch in longline fisheries (ICES, 2013). Terns can be directly impacted by collision with artificial structures above and below water. They are assessed as being sensitive to introduction or microbial pathogens. Terns can be directly impacted by visual disturbance from a variety of activities. Disturbance is thought to have a greater impact on these species when on land at their nesting sites, compared to when they are foraging in the surrounding waters (Goodship & Furness, 2019). Terns are highly vulnerable to depletion of food-fish stocks or effects on their prey habitats (*see also Sandeel sensitivity assessment in FeAST*). Terns may also be sensitive to changes in water turbidity.

### *6.2 Black-legged kittiwake (breeding)*

Kittiwakes may be susceptible to collision (Furness *et al.* 2013) and displacement (Peschko *et al.* 2020) from marine developments. They may also be vulnerable to oil spills (Mendel *et al.* 2008) and organochlorine pollution (Tartu *et al.* 2015), which can lead to lower adult survival and reduced breeding performance (Tartu *et al.* 2013; Svendsen *et al.* 2018). Kittiwakes are identified as potentially sensitive to accidental bycatch in fishing nets particularly in surface gears in UK waters (Bradbury *et al.* 2017). Kittiwakes may also be susceptible to disease (OSPAR Commission, 2009), including avian flu (APHA). Any reduction in prey items will also have an effect on kittiwake populations (Tasker *et al.* 2000), whether due to climate change (Sandvik *et al.* 2014) or industry (Bicknell *et al.* 2013). (*See also Sandeel sensitivity assessment in FeAST*).

### *6.3 Atlantic puffin (breeding), common guillemot (breeding), and razorbill (breeding)*

Auks (guillemot, razorbill and puffins) may be prone to accidental bycatch in fishing nets particularly in surface gears (Zydelis *et al.* 2013). Depletion of prey resources either due to climate change or industry can also have effects on their populations (Mendel *et al.* 2008). These species are also susceptible to large scale mortality in major oil spills (Mendel *et al.* 2008), particularly during their flightless moult period. There is potential for impacts on auk species due to collision with artificial structures under water (Furness *et al.* 2012). Auks may also be susceptible to disease, including avian flu (APHA). These species may be displaced as a result of marine developments (Furness *et al.* 2013) and associated vessel activities (Furness, 2016). Guillemots and razorbills show sensitivity to visual disturbance associated with vessels (Cook & Burton, 2010) and for guillemots, noise disturbance due to marine industry may also occur (Leopold & Camphuysen, 2009). As these are species that feed in the water column, they can be potentially affected by any increase in turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010). (*See also Sandeel sensitivity assessment in FeAST).*

[4] http://www.marine.scotland.gov.uk/feast/

### *6.4 Great skua and Arctic skua (breeding)*

Skuas are identified as among the most vulnerable species to collision mortality impacts in offshore wind farms (Furness *et al*. 2013). Skuas are susceptible to capture in longline fisheries (ICES, 2013). Skuas, especially those individuals specialising in seabird predation, can accumulate high levels of contaminants though no population level consequences of this seem apparent (Furness & Ratcliffe, 2004). Illegal shooting of great skuas is known to occur (Furness & Ratcliffe, 2004) but population level impacts are not known. Skuas are susceptible to disease, including avian flu (APHA). Skuas are susceptible to disturbance at their breeding colonies. If disturbed so that their eggs roll from their nests, they will not attempt to bring the egg back into the nest and as a result the egg (or eggs) may fail to hatch (Furness, 1987). Any reduction of prey items (either directly captured or indirectly from kleptoparasitsing other seabirds) will have a subsequent effect on skuas populations. Great skua are vulnerable to diseases such as avian flu. Declines in skua breeding populations and low breeding success have been linked to reduced sandeel abundance (Perkins *et al.* 2018) and decreases in fisheries discards (Caldow & Furness, 2000; Oswald *et al*. 2008).

### *6.5 European shag (breeding)*

European shag are identified as among the most sensitive species to bycatch in surface gears, pelagic gears and at depth near the seabed in UK waters (Bradbury *et al*. 2017). Vulnerability to pollutants (e.g. polyisobutylene) (Camphuysen *et al.* 2010) and local oiling events (e.g. Heubeck, 1997), can also cause mortality. Severe weather such as storms may cause mortality 'wrecks' in shags. There is also potential for impacts on shag through collision with above water or under water marine developments (Furness *et al.* 2012). Shags are sensitive to vessel disturbance (Jarrett *et al.* 2018), which can affect their foraging behaviour at sea (Cook & Burton, 2010). Any pressure which would result in a reduction of prey for the shag would also have the potential to affect their population. (*See also Sandeel sensitivity assessment in FeAST).*

### *6.6 Northern fulmar (breeding)*

Fulmars are one of the main seabird species taken as accidental bycatch in long-line fisheries in the northern hemisphere (Tasker *et al.* 2000; ICES, 2013) and are identified as among the species most sensitive to bycatch in surface gears in UK waters (Bradbury *et al.* 2017). Examination of corpses indicates high levels of plastic ingestion in fulmars, but there is currently a lack of published information on the population level impacts of this (Franeker *et al.* 2011). Fulmars are also vulnerable to diseases such as avian flu (APHA). Human intrusions and disturbance of fulmars at their nest site can cause nest desertion if they are approached too closely, particularly if there is repeated disturbance during the sensitive egg incubation period. Fulmars are vulnerable to changes in their prey resource, whether due to changes in fisheries practices (Bicknell *et al.* 2013) or to large-scale climatic factors (Thompson & Ollason, 2001).

### *6.7 Northern gannet (breeding)*

Gannets are sensitive to collision with marine developments (Furness *et al.* 2013; ICES, 2015). Gannets are also identified as among the most vulnerable species to bycatch in both surface and pelagic gears in UK waters (Bradbury *et al.* 2017). They are also sensitive to entanglement in discarded fishing net and other plastic waste (Rodriguez *et al.* 2013). Gannets are vulnerable to diseases such as avian flu (APHA). Displacement as a result of marine development may also occur for gannets. This species may also be susceptible to marine litter ingestion or entrapment at their breeding colony (O'Hanlon *et al.* 2017). As these are a species that feed in the water column, they can be potentially affected by any increase in turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010).

### *6.8 Fair Isle wren (breeding)*

As an island population which represents a whole subspecies, this population is very small and thus vulnerable. Other wren subspecies have been the focus of an increase in collecting activity (e.g. St Kilda wren) although there is no evidence this caused a significant decline. In non-migratory populations, severe winters with prolonged snow cover can decimate numbers but this is normally temporary and recovery is quick (Kroodsma et al. 2015). Because of their coastal habit, Fair Isle wrens are more likely to be affected by prolonged stormy weather than frozen conditions (Aspinall and Aspinall, 2011).

## 7 Management

### *7.1 Conservation Measures*

The following conservation measures are currently in place for the Fair Isle SPA:

- The Habitats Regulations require all plans or projects that may have an effect on the protected features of a SPA to be assessed against the Conservation Objectives for that site. This process is known as a Habitats Regulations Appraisal (HRA). An HRA is a statutory procedure that ensures the integrity of the site is maintained. It also provides an opportunity to consider appropriate mitigation that can reduce impacts, avoid adverse effects and permit plans or projects to proceed having taken full account of the protected features of an SPA.

Other relevant measures include:

- The SPA overlaps with a number of notified Site of Special Scientific Interests and management changes described on their lists of Operations Requiring Consent must have prior consent from NatureScot.
- A range of management measures are undertaken within the SPA by the Fair Isle ranger service and others.
- The 'Biosecurity for Scotland's seabird islands' project (2023 – 2026) funded by NRF and led by RSPB Scotland, builds on the Biosecurity for LIFE project (2018 – 2023), and aims to permanently remove the threat of introduction and establishment of invasive predators on seabird islands. The project will work with stakeholders to implement and maintain sustainable biosecurity measures including awareness raising, prevention, surveillance, and incursion response. The Fair Isle SPA is one of the seabird islands this project is focusing work on.

### *7.2 Advice to support management*

Table 2 provides NatureScot's advice on management for activities where we consider this may be necessary to achieve the Conservation Objectives for the protected features. The advice is focused on the activities that cause an effect (a pressure) that a feature is sensitive to. Pressures can be physical (e.g. abrasion of the seabed), chemical (e.g. introduction of pollutants) or biological (e.g. removal of prey resources). Different activities may cause the same pressure, e.g. fishing using bottom gears and aggregate dredging both cause abrasion which can damage the surface of the seabed.

Our advice takes a risk-based approach, i.e. we are focusing on providing advice where we believe there is a risk to achieving the Conservation Objectives. We have identified risks to achieving the Conservation Objectives where there is an overlap between protected features and activities associated with pressures that the features are sensitive to. We have provided management advice to support public authorities and others in managing these risks. Our advice is based on existing data and information on protected features and relevant activities, and our understanding of the relationships between the features and activities. We have identified a range of management advice:

- management to remove or avoid pressures;
- management to reduce or limit pressures; or
- no additional management required.

For our advice on fisheries management we have also stated where we think this should be 'considered.' This term is included to highlight that an issue exists, but circumstances mean that a specific recommendation for action cannot / or need not be made at this point. However, there is sufficient cause to make fishery managers aware of the issue and for them to consider if a fishery management measure may be helpful in achieving Conservation Objectives – particularly where there may be a synergy between the benefits of management actions for the fishery and the Conservation Objectives for the feature. The term 'recommended' highlights that an issue of fishery-feature interaction exists, there is a reasonable evidence base and a specific recommendation can be made/ justified.

New or other activities not identified within the table would need to be considered on a case-by-case basis.

We recognise that stakeholders can provide local environmental knowledge and more detailed information on activities, including in relation to intensity, frequency and methods. This additional information will help public authorities and others develop more specific management, focussed on the interaction between features and activities. If new information becomes available our management advice may be revised.

Table 2 describes the activities that are considered capable of affecting the protected features. Spatial data relating to the location and extent of the activities listed can be accessed on Marine Scotland's National Marine Plan Interactive[5] (where available). Activities that are considered not likely to affect the protected features (other than insignificantly) are listed in Table 3.

### *7.3 Best Practice*

In our management advice for activities in Table 2 we refer to the development, adoption or use of 'best practice' as a way of managing interactions between activities and the features. Best practice is taken to mean approaches or procedures that are developed and accepted by regulators and relevant stakeholders as being an effective way of dealing with an interaction between a habitat or species and the pressures created by an activity. Much of this best practice is already being implemented by sectors and regulators, e.g. pre-application discussions between developers and regulators, the Scottish Marine Wildlife Watching Code, Scottish Outdoor Access Code, and Technical Standards for Scottish Finfish Aquaculture.

[5] https://marinescotland.atkinsgeospatial.com/nmpi/

**Table 2. NatureScot's advice to support management for the Fair Isle SPA for activities which are considered capable of affecting the protected features.**
The text under the 'Advice to support management' columns provides NatureScot's management advice for the features in relation to the activities (further details about the terminology used are provided in section 7.2). Where a cell is coloured grey this indicates that management is already in place, this includes where there are existing regulatory requirements for new proposals. Cells are also coloured grey where it is considered there is no additional management required to achieve the Conservation Objectives. An * has been used to highlight those activities to which the advice under '*Boat use associated with both commercial and recreational activities'* also applies. For some activities, the pressures associated with new proposals are considered unlikely to affect some the features either because these activities do not occur in the same locations as the features or the pressure is unlikely to be at levels that can affect the features (see also Table 3). In these cases, we have not provided advice however, where regulated; this does not exempt new plans or projects related to these activities undergoing a Habitats Regulations Appraisal (HRA).

| **Activities considered capable of affecting the protected features** | **Advice to support management** | |
|---|---|---|
| | **Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, great skua, fulmar, gannet, razorbill** | **Fair Isle wren** |
| **Aircraft (helicopter and unmanned aerial vehicles (UAV))** | **Reduce or limit pressures** (disturbance) associated with UAVs within the SPA through effective mitigation such as:<br>• following the Good Practice Advice for drones and wildlife<br>• seasonal restrictions to avoid sensitive time periods for those protected features most susceptible to disturbance and/or;<br>• spatial restrictions. | |
| **Anchorage areas** | **No additional management** for existing anchorage areas. | *Pressures unlikely to affect this feature.* |
| **Boat use associated with both commercial (includes ship to ship) and recreational activities** | **Reduce or limit pressures** (disturbance) associated with boat use during commercial and recreational activities through effective mitigation such as:<br>• following the Scottish Marine Wildlife Watching Code (SMWWC);<br>• seasonal restrictions to avoid sensitive time periods for those protected features most susceptible to disturbance and/or;<br>• production of vessel management plans associated with activities that require a marine licence. This may include agreed routes and for boats, potential seasonal speed restrictions. | *Pressures unlikely to affect this feature.* |

| Activities considered capable of affecting the protected features | Advice to support management | |
|---|---|---|
| | **Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, great skua, fulmar, gannet, razorbill** | **Fair Isle wren** |
| **Coastal development** | **No additional management** for existing coastal protection and flood defences.<br><br>**Reduce or limit pressures** (disturbance, loss of prey-supporting habitat) associated with new coastal development through effective seasonal and temporal mitigation. | |
| **Commercial shipping*** | **No additional management required** for established routes.<br><br>**Reduce or limit pressures** (disturbance) for new routes or amendments to existing routes within the context of cumulative effects of all boat activity. | *Pressures unlikely to affect this feature.* |
| **Discharges - sewage** | **No additional management** for current levels of discharges. | *Pressures unlikely to affect this feature.* |
| **Farming and livestock** | **No additional management** for current levels of farming and livestock pressures. | *Pressures unlikely to affect this feature.* |
| **Ferry routes** | **No additional management** for current levels of discharges.<br><br>**Reduce or limit pressures** (disturbance) for new routes or amendments to existing routes within the context of cumulative effects of all boat activity. | *Pressures unlikely to affect this feature.* |
| **Fishing - demersal mobile/active gear (inc. mechanical trawls and benthic trawls)*** | Whilst we have limited understanding about the extent of interactions between benthic fisheries and prey supporting habitat within the site, a principal objective of the management of the relevant fisheries should be to ensure that the fishing activity does not cause such disturbance to the benthic habitats that it adversely affects the abundance and availability of prey.<br><br>**Reduce or limit pressures** (removal of prey species and abrasion of prey-supporting habitat) associated with fishing that has the potential to damage | *Pressures unlikely to affect this feature.* |

| Activities considered capable of affecting the protected features | Advice to support management | |
|---|---|---|
| | **Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, great skua, fulmar, gannet, razorbill** | **Fair Isle wren** |
| | seabed habitat (in particular, sandeel habitat, herring spawning grounds) **should be considered**. | |
| **Fishing – hydraulic dredge*** | Hydraulic dredging has the potential to cause significant disturbance to the sediment habitats that support the prey species of the protected features, particularly for sandeel and herring.<br><br>A principal objective of the management of the relevant fisheries should be to ensure that the fishing activity does not cause such disturbance to the benthic habitats that it adversely affects the abundance and availability of prey.<br><br>**Remove or avoid pressures** (removal of prey species and disturbance of prey-supporting habitat) associated with hydraulic fishing that has the potential to damage seabed habitat (in particular, sandeel habitat, herring spawning grounds) **is recommended**. | *Pressures unlikely to affect this feature.* |
| **Fishing – static gear (drift nets and bottom set nets inc. fyke nets)*** | **Remove or avoid pressures** (entanglement) associated with the use of all static nets. Spatial exclusion of all static nets in areas identified as being important for auks, gannet and shag (as identified from habitat and dive depth preferences) **is recommended**. | *Pressures unlikely to affect this feature.* |
| **Fishing – pelagic*** | **Remove or avoid pressures** (removal of key prey species) associated with fishing for sandeels. There is no current targeted sandeel fishery within the SPA, this position should be retained.<br><br>Pelagic fishing for herring/sprat may occur within or around the SPA. We **recommend** that a principal objective of the management of the fishery should be ensuring that the fishing activity does not prevent or disrupt the | *Pressures unlikely to affect this feature.* |

| Activities considered capable of affecting the protected features | Advice to support management | |
|---|---|---|
| | **Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, great skua, fulmar, gannet, razorbill** | **Fair Isle wren** |
| | availability of prey species i.e. it should be considered as part of a broader ecosystem-based approach to management of this fishery. | |
| **Fishing – long-lining (not including jigging)*** | Our current understanding is that long-line fisheries are largely restricted to offshore waters. Site-specific measures for long-lining are not currently considered appropriate due to the scale of the fishery, and the wide-spread interaction with seabirds. However, there is evidence of seabird bycatch in long-line (not jigging) fisheries which **we recommend** require wider seas management measures. | *Pressures unlikely to affect this feature.* |
| **Infrastructure – cables*** | **Reduce or limit pressures** (disturbance, loss or damage to prey-supporting habitat) associated with new cable laying activities within or adjacent to the SPA. | |
| **Ports and harbours (inc. development and ship-to-ship transfer)** | **No additional management** for established activities at ports and harbours within the SPA.<br><br>**Reduce or limit pressures** (disturbance, displacement, loss or damage to prey-supporting habitat) associated with new development proposals or expansion of ports and harbours within or adjacent to the SPA. Appropriate mitigation may include:<br>• spatial limitations to avoid damaging supporting habitat within foraging dive range of the protected features and/or;<br>• seasonal restrictions during construction to avoid periods when birds are present.<br><br>**Reduce or limit pressures** (mortality risk, disturbance, loss or damage to prey-supporting habitat) associated with new ship to ship transfer proposals, and the potential for oil-spill risk. | |
| **Renewable energy (inc. wind)** | There are new marine renewable development proposals within connectivity to the Fair Isle SPA. Mitigation should focus on reducing or limiting pressures (disturbance, displacement, collision) on the protected features. | **Reduce or limit pressures** (disturbance, displacement, collision, loss or damage to prey supporting habitats) for any new onshore wind farm proposals. |
| **Tourism & recreation (inc. jet-skiing, kite surfing, rowing,** | **No additional management** for existing recreational activities (includes angling, boating, diving, kayaking) providing the Scottish Marine Wildlife Watching Code (SMWWC) is followed by water-borne recreational users. The SMWWC highlights why birds are sensitive to disturbance and offers practical advice on how to avoid disturbance. | |

| Activities considered capable of affecting the protected features | Advice to support management | |
|---|---|---|
| | **Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, great skua, fulmar, gannet, razorbill** | **Fair Isle wren** |
| **angling, boating, diving, kayaking)** | **No additional management** requirements for land-based tourism activities (walking), providing Scottish Outdoor Access Code is followed.<br><br>**Reduce or limit pressures** (disturbance) of protected features from jet-skiing.<br><br>**Reduce or limit pressures** (disturbance) where an increase by water-borne or land-based recreational activities demonstrates there is evidence of impacts at particular locations and/or if there is a major increase in intensity of these pursuits within the SPA. There would be potential for some zonation of measures across the site given that some protected features exhibit behavioural sensitivity to disturbance. | |
| **Scientific survey/research** | **No additional management** for current level of scientific survey or research, provided appropriate mitigations to minimise disturbance in the breeding season is in place. | |
| **Seaweed harvesting** | **No additional management** is recommended for existing seaweed harvesting activities for hand-harvesting.<br><br>**Reduce or limit pressures** (disturbance) associated with new seaweed harvesting developments.<br><br>**Remove or avoid pressures** (disturbance, removal of prey supporting habitat) associated with mechanical harvesting of seaweed (in particular, of kelp). | **No additional management** is recommended for existing seaweed harvesting activities for hand-harvesting.<br><br>**Reduce or limit pressures** (disturbance) associated with new seaweed harvesting developments. |
| **Wildlife tour operators*** | **No additional management** for existing wildlife tours providing the Scottish Marine Wildlife Watching Code and the Scottish Outdoor Access Code is followed by Wildlife tour operators.<br><br>**Reduce or limit pressures** (disturbance) associated with an increase in wildlife tour operators if in the future there is evidence of impacts at particular locations and/or if there is an increase in intensity of these pursuits within the SPA. There would be potential for some zonation of measures across the site given that some protected features exhibit behavioural sensitivity to disturbance. | |

**Table 3. Activities that are considered not likely to affect the protected features (other than insignificantly) [6]**

| Activity | Comments |
|---|---|
| **Anchorages & moorings** | Beyond pressures associated with the vessel traffic (covered in Table 2), we are not aware of any further pressures that have the potential to cause an adverse effect on the protected features. |
| **Fishing – static gear – Creels (including lobster, crabs and *Nephrops*)** | Fishing using creels is widespread throughout the MPA. Whilst there is the potential for entanglement for all the protected features, the occurrence is thought to be rare and therefore we consider this method poses a low risk to the protected features. |
| **Fishing – line fishing (jigging)** | Beyond pressures associated with the vessel movement (covered in Table 2), this activity is not expected to have the potential to cause an adverse effect on the protected features. |
| **Infrastructure – pipelines and outfalls.** | There are pressures associated with vessel movements (covered in Table 2) and there is a potential both temporary and permanent seabed habitat destruction. However, due to the scale of it and the low occurrence of this activity in this area at this time, we consider this poses a low risk to conservation objectives. |

[6] Only the specific examples of activities listed in the table have been excluded, rather than the broad activity types. New plans or projects will still need to be considered by the relevant competent authority (see Annex 1 for further details).

## 8 Research and survey

We recognise that there are still important gaps in our understanding and knowledge of the features of this site. We will identify research and survey projects to inform our understanding of these aspects. The knowledge gaps identified below are not a commitment to undertake this work. However, by highlighting these gaps we hope to inform future discussions with parties interested in undertaking research in this site and/or on these features, to help direct research and improve understanding of monitoring needs. The following list of research and survey needs is not prioritised and is not exhaustive.

- Establish adequate baseline information for supporting habitats and prey species and gain an understanding of which prey items are the most important at a local scale within the SPA for all protected features.
- Establish a marine bird monitoring programme that informs changes in species populations and distributions at a site and SPA network level, and which may include monitoring of the supporting prey, habitats and processes within the SPA.
- Further understanding required on the reasons behind the protected features' decline at the SPA. Productivity estimates at the SPA would be beneficial to help understand this decline.
- Further ecological studies of all protected features habitat preferences and use, and movements within the SPA.
- Better understanding on the implications of new onshore and offshore developments around the site on the protected features.
- Oceanographic studies, such as sea temperature and acidity levels, how these might change in future, and the effects of such changes on prey availability for birds.
- Studies of food availability and competition for food between different fish predators (e.g., birds, seals, dolphins, porpoises, whales) in relation to fisheries policy.
- Improved understanding of what supporting processes the key prey species are reliant upon within the SPA.
- Additional research is required to better understand the relationships between the impact of dredging and benthic trawling on supporting habitats, their ability to support suitable prey and any consequential effect this may have on protected features.
- Understanding of the impact of tourism on the protected features at the SPA.
- Understanding of the impacts of non-native mammals on the protected features at the SPA.
- Investigation is required to assess the potential impact of highly pathogenic avian flu on the protected features both within the SPA and at a wider scale, in particular for great skua.
- Research required on the evolution of the HPAI virus, exposure and survival rates in affected seabird species following the 2021-2023 HPAI outbreak.
- Evaluate the potential mitigations that could be put into place to limit disease spread should another outbreak of HPAI occur at this, or any other SPAs.
- Research on whether poor water quality conditions/high turbidity conditions are a problem for tern species in the SPA.
- Better understanding of temporal foraging strategies of fulmar and great skua and whether there are any differences between daytime and night-time attraction of these species to fishing.

- What impact the increase in frequency and severity of storms (as predicted by climate change models) will have on the protected features, in particular for shags that are prone to ‘wreck events’, and the subsequent effects on their abundance or distribution.
- Research on factors affecting the productivity of Fair Isle wren at the Fair Isle SPA.
- Better understanding on the implications of new tidal developments around the site on the protected features.

**Annex 1. Fair Isle SPA Conservation Objectives**

The box below provides the high-level Conservation Objective statements for the Fair Isle SPA.

The full Conservation Objectives, which includes site-specific advice and information on the qualifying features that form part of this SPA, are provided in the tables that follow. The site-specific advice and information provides more detail in relation to each of the high level Conservation Objective statements for each feature, e.g. detail on the seasonal timings and what the supporting habitats and prey are for the qualifying features.

Information is also provided below on how minor changes to features should be considered and the influence of environmental change on features, particular in relation to climate change. Temporary impacts on the qualifying features resulting from plans or projects can only be permitted where there is certainty that the features will be able to quickly recover. Further details on the potential for each qualifying feature to recover are described in more detail in Annex 2 '*Factors determining the potential of features to recover'*.

A definition of the terms used is in the Glossary (Annex 3). The * denotes a qualifying feature that is an assemblage feature only.

| **Fair Isle SPA** |
|---|
| Qualifying features:<br>• Arctic skua *(Stercorarius parasiticus)**<br>• Arctic tern *(Sterna paradisaea)*<br>• Atlantic puffin *(Fratercula arctica)**<br>• Black-legged kittiwake *(Rissa tridactyla)**<br>• Common guillemot *(Uria aalge)*<br>• European shag *(Phalacrocorax aristotelis)**<br>• Fair Isle wren *(Troglodytes troglodytes fridariensis)*<br>• Great skua (*Stercorarius skua)**<br>• Northern fulmar *(Fulmaris glacialis)**<br>• Northern gannet *(Morus bassanus*)*<br>• Razorbill *(Alca torda)** |
| The Fair Isle SPA also supports:<br>• Breeding seabird assemblage (includes all seabird qualifying features) |
| 1. To ensure that the qualifying features of the Fair Isle SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.<br><br>2. To ensure that the integrity of the Fair Isle SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:<br><br>2a The populations of the qualifying features are viable components of the Fair Isle SPA.<br><br>2b. The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.<br><br>2c. The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Fair Isle SPA. |

| **1. To ensure that the qualifying features of the Fair Isle SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.** |
|---|
| Achieving FCS is defined in terms of the natural range and population of the species and the extent of habitat necessary for long-term maintenance of populations. There is an important role for all protected sites in the UK in defining, achieving and maintaining FCS for any habitat or species. Achieving FCS requires that each parameter is either stable or increasing, exceeds the relevant reference value and has good prospects of continuing to do so in the foreseeable future (JNCC, 2018). Favourable Conservation Status (FCS) is assessed across the Marine Atlantic Biogeographic Region with individual SPAs and SPA networks contributing to FCS.<br><br>The conservation status will be taken as 'favourable' when:<br>• population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;<br>• the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future;<br>• there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis;<br><br>When carrying out appraisals of plans and projects against these Conservation Objectives, it is not necessary to understand the status of the qualifying features within each individual SPA in this Biogeographic Region. The focus of the appraisal should be to understand whether the integrity of the Fair Isle SPA would be maintained. If this is the case, then its contribution to FCS across the qualifying features' biogeographic range will be met. Similarly, when determining whether management measures may be required to ensure that the Conservation Objectives for this SPA are achieved, the focus should be on maintaining the contribution that it makes to FCS. Further advice on how these appraisals should be focussed in relation to maintaining site integrity is provided by Conservation Objective 2 (including parts a, b and c). If broader information (status, trends) on the qualifying features is available, it should be used to provide context to the site-based appraisal.<br><br>Note '*Appropriate'* within this part of the Conservation Objectives is included to indicate that the contribution to FCS varies from site to site, and feature to feature. |

**2. To ensure that the integrity of the Fair Isle SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:**

This objective recognises that Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, and razorbill are in unfavourable condition at the Fair Isle SPA and consequently site integrity is compromised.

For Fair Isle SPA, when carrying out appraisals of plans or projects, the focus of the appraisal should be to understand the impact of the plan or project on site integrity. For qualifying features that are favourable condition this means maintaining that condition. For those qualifying features that are in unfavourable condition, it means ensuring that the plan or project does not prevent or reduce the potential for recovery. The expectation is not for the plan or project to restore site integrity. Should the plan or project compromise the ability of the qualifying features to recover (e.g. result in a further decline or accelerate the rate of decline, or prevent a recovery from occurring), then the Fair Isle SPA will not make an appropriate contribution to achieving FCS across the Atlantic Biogeographic Region. Similarly, when determining whether management measures are required to meet the Conservation Objectives, the focus is on ensuring the conditions are appropriate to support recovery and subsequently restore site integrity. Further advice on how these appraisals should be focussed in relation to site integrity is provided in 2a, b and c.

The breeding seabird assemblage is not considered further in the Conservation Objectives as each qualifying feature and 'named qualifier' of the assemblage are addressed individually.

Temporary impacts on these objectives resulting from plans or projects can only be permitted where there is a high degree of certainty that the features will be able to quickly recover from the impact and that impacts do not prevent the ability of unfavourable features to fully recover in the long-term.

***Environmental changes***

This Conservation Objective recognises that the qualifying features are part of a complex, dynamic and multi-dimensional marine environment. Marine birds depend on environmental conditions (for example water movement, up-wellings and prevailing weather) which vary over time and space. Consequently, marine bird species are exposed to a wide range of drivers of change. 'Environmental changes' for the purpose of these Conservation Objectives means any change to the qualifying features reflecting both natural population dynamics and also broader environmental changes (i.e. those related to climate change and environmental variability, management of which is beyond the scope of the SPA). The impact of human activities on the SPA that can be managed will not be considered as part of the broader context of environmental change (i.e. where required they should be managed).

Some site-level changes are natural and are not a direct result of human influences (e.g. population fluctuations arising from factors such as variable breeding success or weather conditions across the wintering range / shifts or changes in prey availability resulting from variability in environmental factors processes such as water temperature and movements). Changes in the qualifying features' distribution and use of the site, which are brought about by entirely natural drivers, directly or indirectly, are normally considered compatible with the SPA's Conservation Objectives.

There may also be historical human influences that have now ceased but have modified and continue to drive change within the site. It is also recognised that climate change pressures could affect the qualifying features within the site. These changes cannot be prevented, so the Conservation Objectives seek at a site level to take account of them and where possible, improve the qualifying species' resilience to environmental change when considering future plans or projects. The magnitude of the future impacts will depend on the nature, scale, duration and intensity of the activity and the qualifying features tolerance and ability to recover from such an impact.

Additionally, management of human activities at a wider scale (i.e. regional, Scotland or the area covered by an international agreement such as the OSPAR convention) may also affect the qualifying features associated with this site (either by making a positive contribution or having a negative impact). Wider scale impacts may affect the ability of the qualifying features to recover from site level changes, and therefore additional precaution over the impacts of any future human activities may be necessary.

An assessment of whether a change is natural or anthropogenic, or a combination of both, will need to be looked at on a case-by-case basis.

In relation to the Fair Isle SPA and its qualifying features, the following effects of environmental change (climate change) are relevant. These effects should be taken into account when considering plans and projects as additional pressures may reduce the protected features' resilience to climate change, and conversely climate change impacts may start to hinder the their ability to recover from human activities.

- ***All qualifying features -*** Under climate change, sea temperatures are predicted to increase, sea levels will rise and there could be increases in the frequency of stormy conditions. Increased levels of atmospheric $CO_2$ will also result in ocean acidification. Any of these factors could cause changes in bird abundance and distribution at the SPA due to changes in prey (species, availability and distribution).
- ***For breeding seabirds -*** climate change may result in effects at wintering grounds or in other parts of the overall breeding range which could have subsequent effects on their breeding population and distributions. For any burrow or hole nesting species (Atlantic puffin) an increase in rainfall due to climate change could also have adverse effects during the incubation period which may result in increased mortality of eggs or chicks due to a flooded burrow or hole. Climatic changes may also result in colonies being more prone to soil erosion which would in turn mean reduced habitat availability for burrowing species. In coastal breeding sites, increased flooding associated with storm tides may also cause nest site failures in breeding seabirds (Mendel *et al.* 2008).
- ***Auks (puffin, guillemot and razorbill):*** Auks may be vulnerable to extreme weather events, particularly winter storms, which have been linked to adult mortality and winter 'wreck' events (BirdLife International, 2019). Decreased survival rates in these species have been linked to increased sea temperatures and stronger winds (Votier *et al.* 2005; 2008; Sandvik *et al.* 2005).

- ***Kittiwake:*** Breeding phenology is affected by climate change, with a trend in later breeding being seen in kittiwakes (Wanless *et al.* 2009). Kittiwake breeding populations are highly vulnerable to the impacts of climate change on the population dynamics and distribution of their preferred prey (e.g. Sandvik *et al.* 2014).
- ***Shag:*** Shags are susceptible to increased storminess and extreme weather which can lead to mass mortality events, particularly in the winter (Bustnes *et al.* 2013).
- ***Fair Isle wren:*** Increased storminess may affect the Fair Isle wren population, which is largely confined to the coastal edge, and forages on the tideline (Williamson, 1958).
- ***Arctic tern:*** Arctic tern populations in the UK are highly susceptible to climatic fluctuations or change (Russell *et al.* 2015). Due to their high reliance on sandeels, terns are vulnerable to any changes in the distribution and abundance in sandeel populations, which may come about as a result of climate change. Severe weather events can also have consequential effects on breeding terns.
- ***Fulmar:*** a species which has been identified as sensitive to climate change. Studies have demonstrated a link between a large-scale climatic factor, the North Atlantic Oscillation (NAO) on both survival and reproduction. Survival in fulmars, particularly of females, has been shown to be influenced by the NAO (Grosbois & Thompson 2005). Reproductive success at this colony has also been linked to winter NAO and lagged winter NAO, with year to year variation in breeding success strongly related to oscillations in the NAO (Thompson & Ollason 2001; Lewis et al. 2009).
- ***Gannet:*** Gannets can travel great distances from their nest site to forage and are able to exploit a wide range of prey. Hence, they may have greater potential than some other seabird species to adapt to climate change. However, in the North West Atlantic, a century-long population trend of northern gannets correlated with warming surface water conditions and increased mackerel availability on a decadal scale, indicating that climate change effects on diet is likely for this species (Montevecchi & Myers, 1997).
- ***Skuas (Great skua and Arctic skua):*** Skuas are potentially vulnerable to direct and indirect (through changes to prey dynamics) impacts of climate change (Oswald *et al.* 2008).

**2a. The populations of the qualifying features are viable components of the Fair Isle SPA.**

This objective seeks to specifically protect the qualifying features from ***significant*** mortality, injury or removal that can lead to a long-term decline of the feature(s) within the site. It protects the features from significant risk of incidental killing and injury from activities both within and outwith the site. Impacts and effects are considered 'significant' where they could result in a permanent reduction or continued decline in the population and consequently, reduction in the contribution the Fair Isle SPA makes to the maintenance of the qualifying features in their natural range in the UK. It should be ensured that the qualifying features are protected from anthropogenic pressures that could lead to a significant long-term decline in numbers using the site, such that recovery cannot be expected. Ensuring the capacity of the Fair Isle SPA to support all the essential behaviours and activities required to support viable populations of the qualifying features in the relevant season(s) are addressed by Conservation Objectives 2b and 2c.

At a site level, the population is considered to be viable if the species can carry out their life cycle functions relevant to the season(s) they are present, irrespective of dependencies such as immigration. For the qualifying features, the viability of the species within the Fair Isle SPA is intrinsically linked to their ability to access and use foraging habitat in areas of functionally linked sea, within foraging range, outwith the site, in addition to the ability of the site to support breeding adult survival and chick-rearing.

When assessing the effects of any plan or project consideration should also be given to whether impacts outwith the SPA could affect achievement of this Conservation Objective. This Conservation Objective is considered to be met if the conditions to support all the species' essential behaviours and activities are in place. This includes:

- avoiding effects within and outwith the site that could prevent or reduce the ability of the populations of qualifying features to recover.
- avoiding effects within and outwith the site that could lead to a permanent reduction in the populations of qualifying features through mortality, injury, or impacts caused by disturbance, displacement, barrier effects or reduction in mobile prey resources.
- maintaining the species' ability to use all areas of importance within the site (to be considered under Conservation Objective 2b)
- maintaining access to, and availability of, supporting habitats and prey within the site (to be considered under Conservation Objective 2c).

Where known, the populations of the qualifying features should be maintained at or above site reference populations, as detailed below. The site reference population may be revised from the baseline at designation where a) there is evidence to show that a population's size has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally equivalent to at least one generation length for the given species) and/or b) to reflect any wider strategic objectives for the species (e.g. national or international species action plan). Where there is evidence to show that a qualifying feature has historically been more abundant than the stated minimum target and current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account.

All qualifying features are protected throughout the whole site, throughout the year. This means that irrespective of the season for which they are designated, the qualifying features are protected during both their breeding and non-breeding seasons when using the SPA.

Temporary short-term changes in the populations due to human activity may be considered not to compromise the Conservation Objectives within the site provided it can be demonstrated that the populations of any affected qualifying features can fully recover. Factors limiting the recovery of the qualifying features include: the average generation times, population growth rates, availability of prey and the timing and duration of the activity around vulnerable stages of their life cycles such as during moulting or chick-rearing period.

Direct mortality can arise from: collision (above and underwater); entanglement (incidental bycatch); and pollution. Indirect mortality can arise from loss of or damage to prey or prey-supporting habitats (e.g. through harvesting; physical removal of or damage to seabed; nutrient enrichment; changes to water temperature, salinity, or flows; introduction of invasive non-native species (INNS); pollution). Indirect mortality can arise from reduced ability to capture or access prey arising from e.g. increased water turbidity or displacement from foraging areas.

| **The site-specific information includes a site reference population that is considered the most appropriate for assessments of plans and projects. Where this is based on the citation population at classification or recent surveys, the site reference population is rounded using standard procedures (Stroud *et al.* 2001).** | | |
|---|---|---|
| **Feature** | **Site-specific advice** | **Site-specific information** |
| Arctic Skua | Ensure the breeding population of Arctic skua has the ability to recover to the site reference population.<br><br>***and***<br><br>Ensure Arctic skua are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure Arctic skuas can move safely between the site and important areas of functionally linked sea outwith the site. | The site reference population for breeding Arctic skua at the Fair Isle SPA is 110 pairs (1994 citation), representing 3% of the GB breeding population. The latest count at the Fair Isle SPA in 2023 showed this figure has decreased by 80% to 22 pairs. The steep decline at the site level reflects the national trend. Arctic skuas are one of the most rapidly declining species in the UK over the past few decades, with a decrease of 66% since Seabird 2000 (1998–2002) (Burnell *et al.,* 2023). Monitoring in 2023 indicated a further decline of 28% in Scotland due to avian flu (Tremlett *et al.,* 2024).<br><br>Reasons for the decline in Arctic skua at the Fair Isle SPA is likely related to changes in prey availability within the marine environment. Competition with and predation by great skuas may also be a contributing factor.<br><br>The long-term recovery of Arctic skuas at the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| Arctic tern | Ensure the breeding population of Arctic tern has the ability to recover to the site reference population.<br><br>***and*** | The site reference population for breeding Arctic tern at the Fair Isle SPA is 1,100 pairs (1994 citation), representing 1% of the GB breeding population. The latest minimum count at the Fair Isle SPA in 2023 showed this figure has decreased to 295 pairs. Arctic tern populations have decreased by 35% in the UK since Seabird 2000 (1998-2002) and have decreased by 54% in Scotland (Burnell *et al.,* 2023). Monitoring in 2023 indicated a further decline of 5% in Scotland due to avian flu (Tremlett *et al.,* 2024). |

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| | Ensure Arctic terns are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure Arctic terns can move safely between the site and important areas of functionally linked sea outwith the site. | Reasons for the decline in Arctic tern at Fair Isle SPA is likely related to offsite factors such as changes in prey availability within the marine environment.<br><br>The long-term recovery of Arctic tern at the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| Atlantic puffin | Ensure the breeding population of puffin has the ability to recover to the site reference population.<br><br>***and***<br><br>Ensure puffins are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure puffins can move safely between the site and important areas of functionally linked sea outwith the site. | The site reference population for breeding puffins at the Fair Isle SPA is 23,000 individuals (1994 citation), representing 2% of the GB breeding population. The last count at Fair Isle SPA in 2015 showed this figure has decreased to 6,666 individuals. Puffin populations have been generally increasing within the UK (long-term trend between 1969-2000) (Harris & Wanless, 2004). However, recent trends show that puffins have decreased by 15% since Seabird 2000 (1998-2002), and in Scotland they have decreased by 21% (Burnell *et al.,* 2023).<br><br>Reasons for the decline in puffins at the Fair Isle SPA is likely related to offsite factors such as changes in prey availability within the marine environment. Tagging studies on puffins from Shetland have shown that they are travelling huge distances in order to forage.<br><br>The long-term recovery of puffins at Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |

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| Black-legged kittiwake | Ensure the breeding population of kittiwake has the ability to recover to the site reference population.<br><br>***and***<br><br>Ensure kittiwakes are not at significant risk from injury.<br><br>***and***<br><br>Ensure kittiwakes can move safely between the site and important areas of functionally linked sea outwith the site. | The site reference population for breeding kittiwakes at the Fair Isle SPA is 18,000 pairs (based on 1994 citation), representing 4% of the GB population. The latest count data available from SMP for Fair Isle SPA in 2021 showed a dramatic decrease of kittiwakes to 448 pairs. Kittiwake populations have declined in both Scotland and the UK, with decreases of 42% in their UK population since Seabird 2000 (1998-2002) and 57% in Scotland (Burnell *et al.,* 2023).<br><br>It is acknowledged that due to the steep national decline in kittiwakes it will be difficult to recover the kittiwake population to the site reference population. Wider pressures on kittiwakes, such as climate change or disease, may limit the potential for kittiwakes to achieve Favourable Conservation Status. Another on-site factor may include predation by great skua, although the extent to which this occurs is not known.<br><br>Therefore, when assessing the effects of any plan or project, consideration should be given to ensuring that the plan or project will not hinder the ability to recover. This will help ensure resilience within the wider kittiwake population.<br><br>Plans or projects should also ensure that kittiwakes are not at significant risk from injury or mortality either within or outwith the SPA.<br><br>The long-term recovery of kittiwakes at the Fair Isle SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. outwith the SPA. |
| Common guillemot | Ensure the breeding population of guillemot has the ability to recover to the site reference population.<br><br>***and*** | The site reference population for breeding guillemots at the Fair Isle SPA is 32,000 individuals (based on 1994 citation). The latest count data available in 2021 shows this number has declined to 18,295 individuals. Guillemot populations in the UK decreased by 8% since Seabird 2000 (1998-2002) and 31% in Scotland (Burnell *et al.,* 2023).<br><br>No factors at the breeding colony appear to be the cause of this decline and thus the decline is likely to relate to their food supply in the marine environment.<br><br>The long-term recovery of guillemots at the Fair Isle SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the |

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| | Ensure guillemots are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure guillemots can move safely between the site and important areas of functionally linked sea outwith the site. | effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| European shag | Ensure the breeding population of shag have the ability to recover to the site reference population.<br><br>***and***<br><br>Ensure shag are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure breeding shag can move safely between the site and important areas of functionally linked sea outwith the site. | The site reference population for breeding shags at the Fair Isle SPA is 1,100 pairs (1995 citation), representing 4% of the GB population. The latest count data available in 2021 showed that shags have declined considerably to 94 pairs. This decline at a site level reflects a wider decline in shag populations. Shags have experienced a 20% decrease in their breeding populations within the UK since Seabird 2000 (1998-2002) and within Scotland their populations have decreased by 22% since Seabird 2000 (Burnell *et al.,* 2023).<br><br>No factors at the breeding colony appear to be the cause of this decline and thus the decline is likely to relate to their food supply in the marine environment and offsite factors.<br><br>The long-term recovery of shags at the Fair Isle SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |

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| Fair Isle wren | Maintain the breeding population of Fair Isle wren at a stable or increasing trend relative to the current site reference population.<br><br>***and***<br><br>Ensure Fair Isle wrens are not at significant risk from injury or mortality. | The site reference population for Fair Isle wren at the Fair Isle SPA is 33 territorial males (1995 citation), representing 100% of the GB population. The latest count data available at Fair Isle SPA in 2012 showed the population was 38 pairs. This figure meets the target of at least 26 pairs (baseline at citation minus 25%).<br><br>When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| Great skua | Maintain the breeding population of great skuas at a stable or increasing trend relative to the current site reference population.<br><br>***and***<br><br>Ensure great skuas are not at significant risk from injury or mortality.<br><br>***and*** | The site reference population for breeding great skuas at the Fair Isle SPA 110 pairs (based on 1995 citation), representing 1% of the GB population. The latest count in 2023 showed this figure has increased to 153 pairs. Great skuas had experienced a long-term increase within the UK (between 1969-2000) (JNCC, 2019), and the population at Fair Isle SPA had reached 430 pairs in 2016. In the summer of 2021 and 2022 the great skua population was impacted by avian flu, which has reduced the population to 153 pairs, a reduction of 64% of the site population (Tremlett et al., 2024). Monitoring in 2023 indicated a Scotland wide decline of 76% in due to avian flu (Tremlett *et al.,* 2024).<br><br>The long-term maintenance of great skuas at the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |

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| | Ensure great skuas can move safely between the site and important areas of functionally linked sea outwith the sites. | |
| Northern fulmar | Maintain the breeding population of fulmar at a stable or increasing trend relative to the current site reference population.<br><br>***and***<br><br>Ensure fulmars from are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure fulmars can move safely between the site and important areas of functionally linked sea outwith the sites. | The site reference population for breeding fulmars at the Fair Isle SPA 35,000 pairs (based on 1995 citation), representing 7% of the GB population. The latest count in 2021 showed this figure has increased to around 32,491 pairs. This figure meets the target of at least 26,408 pairs (baseline at citation minus 25%). Fulmar populations in the UK have decreased by 35% since Seabird 2000 (1998-2002). In Scotland fulmar have decreased by 37% (Burnell *et al.,* 2023).<br><br>The long-term maintenance of fulmars in the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| Northern gannet | Maintain the breeding population of gannets at a stable or increasing trend relative to the | The site reference population for breeding gannets at the Fair Isle SPA is 1,200 pairs. The latest assessment in 2023 noted an increase in population from citation to 4,827 pairs. Gannets in the UK have increased by 38% since the last gannet census (2003-2005), and have increased by 40% in Scotland in the same period (Burnell *et al.* 2023). |

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| | current site reference population.<br><br>***and***<br><br>Ensure gannets are not at significant risk from injury or mortality.<br><br>***and***<br><br>Ensure gannets can move safely between the site and important areas of functionally linked sea outwith the sites. | However, in the summers of 2021 and 2022, gannet populations were affected by avian flu. Monitoring in 2023 indicated a further decline of 22% in Scotland due to avian flu (Tremlett *et al.,* 2024).<br><br>The long-term maintenance of gannets at the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |
| Razorbill | Ensure the breeding population of razorbills have the ability to recover to the site reference population.<br><br>***and***<br><br>Ensure razorbill are not at significant risk from injury or mortality.<br><br>***and*** | The site reference population for breeding razorbills at the Fair Isle SPA is 3,400 individuals (1986 citation), representing 2% of the GB population. The latest count data showed this number has decreased to around 1,925 individuals (2021 count). This is in contrast to the UK population trend where Razorbills populations have increased by 18% since Seabird 2000 (1998 – 2000). However, in Scotland the opposite trend is emerging with razorbill populations having decreased by 2% in the same period (Burnell *et al.,* 2023).<br><br>Reasons for the decline in razorbills at the Fair Isle SPA, when nationally they are increasing, are most likely to relate to changes in prey availability within the marine environment. However, further research is required to see if any on-site factors, such as disturbance, could be a contributing factor in their decline. Obtaining accurate counts of razorbills at the Fair Isle SPA is also difficult as they nest in more enclosed sites at this SPA.<br><br>The long-term recovery of razorbills at the Fair Isle SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. When assessing the effects of any plan or project consideration should therefore also be given to whether impacts on the population whilst outwith the SPA could affect achievement of this Conservation Objective. |

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| | Ensure razorbills can move safely between the site and important areas of functionally linked sea outwith the site. | |

**2b. The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.**

This objective seeks to ensure that the qualifying features can continue to use and access all areas within the Fair Isle SPA used for breeding, feeding, moulting, roosting, loafing, shelter and other maintenance activities. Changes in the distribution of the qualifying features are most likely to be brought about through disturbance, therefore this objective relates to avoiding significant disturbance. Disturbance associated with human activity may take a variety of forms including: noise, light, sound, vibration, trampling, presence of people, animals and structures, as well as displacement and barrier effects on the species. The type of disturbance, its duration and the area over which the qualifying features are likely to be affected are important considerations in any appraisal of disturbance.

Disturbance can, for example, result in changes to feeding or roosting behaviour, increased energy expenditure due to increased time spent moving to avoid stressors , abandonment of nest sites and desertion of supporting habitat (both within or outside the protected area where appropriate). This may affect successful chick rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts.

'Significant disturbance' should be interpreted to mean disturbance that affects the integrity of the site through alteration of the distribution of the qualifying features such that recovery cannot be expected or effects can be considered long term. It is expected that significant disturbance will lead to more than a transient effect on the distribution of the qualifying features. It may result in the following types of effect:

- Contributes to the long-term decline in the use of the site by the qualifying features.
- Changes to the distribution of the qualifying features on a continuing or sustained basis.
- Changes to the qualifying features behaviour such that it reduces the ability of the species to survive, breed or rear their young.

There are two main ways in which the qualifying features' continued access to suitable resources could be restricted and distribution affected and this is where assessments should be focussed:
1. Large scale physical barriers, or;
2. Significant disturbance which alters their distribution within the site or disrupts important behaviours.

Temporary short-term disturbances due to human activity may be considered not to compromise the Conservation Objectives within the site provided it can be demonstrated that the population can fully recover with a high degree of certainty. Factors limiting the recovery of the

qualifying features include the timing, frequency and duration of the activity around vulnerable stages of their life cycle such as during moulting or chick-feeding period.

**All qualifying features are protected throughout the whole site, throughout the year.** We anticipate that some locations within the Fair Isle SPA will be more, or less, important than others for individual species. Distributions within the site may also change over time in response to a range of abiotic and biotic factors (e.g. changes in abundance or quality of prey resources at particular locations, numbers of each qualifying feature within the site as a whole, seasonal fluctuations or trends in prevailing weather conditions etc.). In some cases detailed bespoke surveys of bird numbers and distributions, to determine qualifying features' current usage of particular locations within a proposals area of influence, may be required to complete the necessary assessments.

Direct displacement/redistribution of the qualifying features can arise from: barriers to movement to and between foraging and roosting locations; and visual disturbance (e.g. associated with vessel movements). Indirect displacement/redistribution can arise from loss of or damage to prey or prey-supporting habitats (e.g. through harvesting; physical removal of or damage to seabed; nutrient enrichment; changes to water temperature, salinity, or flows; introduction of INNS; pollution (e.g. light, noise, chemical)).

***For breeding seabirds:*** Disturbance to foraging birds may reduce the time spent feeding or cause them to move to different areas that are less energetically profitable. Disturbance that creates an avoidance response or disrupts/reduces incubation, chick-rearing, foraging or resting behaviour can also put increased energetic demands on birds during an already energetically expensive season. Ensuring safe movement within and between the breeding colony and those areas used for foraging, roosting and other maintenance behaviours (see also 2c) is important to meet the energetic demands required to achieve or maintain body condition needed to support migration and successful breeding and for subsequent winter survival,. Barriers to movement may reduce access to preferred foraging habitat and cause sub-optimal foraging.

| Feature | Site-specific advice | Site-specific information |
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| Arctic skua | Ensure Arctic skuas continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to Arctic skuas and ensure | Arctic skuas are a trans-equatorial migratory species, which are present at Fair Isle SPA during their breeding period from the beginning of May to end of August.<br><br>Arctic skuas at the Fair Isle SPA will nest on coastal, heathland or moorland areas. Their nest territories are distributed mainly in the Northern part of the SPA, with other individual territories scattered elsewhere both within and outwith the SPA.<br><br>The mean maximum foraging range of Arctic skuas is 63 ± 18 km (Thaxter *et al.* 2012). Although birds from Shetland may be travelling much further in order to forage. Arctic skuas will forage within the marine extension of the Fair Isle SPA and in the seas beyond. |

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| | individuals can move safely between these areas within the sites. | |
| Arctic tern | Ensure Arctic terns continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to Arctic terns and ensure individuals can move safely between these areas within the site. | Arctic terns are migratory, moving from their breeding grounds in the Fair Isle SPA and their wintering grounds in the Southern Ocean and the southern tips of South American and Africa. They are present at the Fair Isle SPA between May to the end of August.<br><br>Within the Fair Isle SPA, Arctic terns are distributed throughout the SPA. Arctic terns forage over the open sea, in nearshore waters and along edges of sandy or rocky shores, tidal flats, and over tide rips or drift lines (Eglington & Perrow, 2014). They have also been observed using floating seaweed as a foraging habitat (Vandendriessche *et al.* 2007). Their mean maximum foraging range from the breeding colony during the breeding period is 25.7+/-14.8km (Woodward *et al.* 2019). They tend to forage in water depths of between 10-20m (Schwemmer *et al*. 2009), although foraging mainly takes place where prey is within 20 cm of the surface (Eglington & Perrow, 2014). |
| Atlantic puffin | Ensure puffins continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to puffins and ensure individuals can move safely between these areas within the site. | Puffins are migratory species which remain offshore during the non-breeding period and move from their breeding grounds such as the Fair Isle SPA and wintering grounds potentially near the Azores, Canary Islands, north-west Africa and the western Mediterranean. They are present at Fair Isle SPA from mid-March until end of August. In some exceptional years adults may still be feeding chicks in September. Puffins have their flightless moult period from beginning February-mid March.<br><br>Puffins nest in cliff-top burrows and, to a lesser-extent, coastal boulder screes. Puffins will use both inshore and offshore pelagic and shelf-waters in which to forage, roost and for other maintenance activities. Foraging is largely restricted to dive depths of up to 70m, although their average dive depth is around 35m (Harris & Wanless, 2011; Ropert-Coudert *et al.* 2018). Their mean maximum foraging range in the breeding period is 137.1+/128.3km, though they can range up to around 380km (Woodward *et al.* 2019). However, when feeding chicks birds generally forage within 10km of their colony.<br><br>In spring, puffins assemble close inshore in large rafts on the water pre-breeding, where courtship takes place (Snow & Perrins, 1998). Puffins will often roost on the sea at night and will forage early in |

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| | | the morning, returning to their chicks for provisioning (Boag & Alexander, 1998). During the fledgling period young will leave their burrow at night and make their way to the sea. |
| Black-legged kittiwake | Ensure kittiwakes continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to kittiwakes and ensure individuals can move safely between these areas within the site. | Kittiwakes are migratory species. The vast majority of adults from North Atlantic colonies such as Fair Isle SPA appear to winter in the west Atlantic between Newfoundland and the mid-Atlantic ridge with relatively small numbers wintering in the North Sea and west of the British Isles. Kittiwakes are present at Fair Isle SPA during their breeding period from mid-April to end of August. However, feeding aggregations may still be seen around the Scottish coast until late October/early November. They will therefore be present during both the breeding and non-breeding seasons.<br><br>In Fair Isle SPA kittiwakes nest on steep, coastal cliffs and offshore stacks, and may roost on manmade walls and sandy shores. They require access to areas of fresh water for bathing. Kittiwakes at Fair Isle SPA will use inshore waters within 1km of the colony for loafing, preening, bathing and other important maintenance behaviours, and waters further offshore and on the continental shelf for foraging. In the breeding period, the mean maximum foraging range for kittiwakes is 156.1+/- 144.5km, though they will forage further, with a maximum range of 770km (Woodward *et al.* 2019). After breeding, kittiwakes will also use sandy beaches near their breeding grounds to moult in large flocks. |
| Common guillemot | Ensure guillemots continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to guillemots and ensure individuals can move safely between these areas within the site. | Guillemots remain near their breeding colonies throughout the year and will continue to attend their breeding sites at Fair Isle SPA frequently during the non-breeding period, particularly from February onwards. From the beginning of August to mid-October they will remain on the waters by Fair Isle SPA, where adults will undergo a flightless moult period. Their breeding season is from April until mid-August.<br><br>Guillemots nest in dense colonies on bare cliff ledges at Fair Isle SPA. They use offshore waters as well as areas close to the coast to forage, rest, and carry out other maintenance activities. In the breeding period, the foraging range of guillemot has a mean maximum of 73.2 ± 80.5 km, with a maximum range of 338km (Woodward *et al.* 2019). Guillemots forage both at the seabed (demersal) and within the water column (pelagic), primarily during daylight hours (Wakefield *et al.* 2017). They have an average dive depth of 42m, though can forage up to 200m depth (Ropert-Coudert *et al.* 2018).<br><br>Guillemots may fly in small groups and will often form large rafts on the sea close in the colony before heading out on a foraging trip. When ready to fledge the chick will leave the nest site and joins the male of the pair on the sea, where they travel further out to sea together and remain close for around two months (Harris & Wanless, 2003). |

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| European shag | Ensure shags continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to shags and ensure individuals can move safely between these areas within the site. | Shags are a resident UK species and are present within the Fair Isle SPA throughout the year. Their main breeding period is from March to September.<br><br>Shags forage by day and tend not to feed far from land. In the breeding season, shags mean maximum foraging distance is 13.2+/-10.5km, though a maximum foraging distance of 46km has been noted (Woodward *et al.* 2019).<br><br>Shags nest among coastal boulders and on ledges in geos and caves.<br><br>Shags are benthic feeding piscivores. As such, foraging areas tend to coincide with areas of sandy benthic sediment, and occur where depth is less than 80 m (Daunt *et al.* 2015). Shags mostly dive to 10-40m, though dives of more than 50m have been recorded (Daunt *et al.* 2015; Watanuki *et al.* 2008). |
| Fair Isle wren | Ensure Fair Isle wrens continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to Fair Isle wrens and ensure individuals can move safely between these areas within the site. | Fair Isle wrens will be present at the Fair Isle SPA throughout the year. Their breeding season is from March to the end of August, and their non-breeding period from September to end of February.<br><br>Fair isle wrens nest almost exclusively on the island's cliffs (Aspinall and Aspinall 2011). |
| Great skua | Ensure great skuas continue to have access to and can utilise all | Great skuas are a migratory species. Their main wintering distribution ranges from the Celtic Sea to southern Europe and to the coast of northwest Africa. The Bay of Biscay is of particular importance for wintering birds (Furness, 2007; Magnusdottir *et al.* 2012). However, some great skuas do remain in |

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| | optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to great skuas and ensure individuals can move safely between these areas within the site. | Scottish waters. Great skuas are present at Fair Isle SPA during the breeding period from April to mid-September.<br><br>Great skuas nest on moorland and hillsides throughout the Fair Isle SPA. Great skuas feed by kleptoparasitising other seabirds, by predating eggs, chicks and adult birds and by scavenging as well as by foraging at sea. Fishery discards have been an important food source in the past. They have a mean maximum foraging range of 443.3+/- 487.9km during the breeding season, but may forage over 1000km (Woodward *et al.* 2019). Great skuas can dip under the surface or grab from the surface but will not generally dive under (Snow & Perrins, 1998), though they can submerge up to 0.5m (Furness, 1987). Great skuas feed only during the day (Furness 1987). Breeding skuas will often bathe communally in freshwater. |
| Northern fulmar | Ensure fulmars continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to fulmars and ensure individuals can move safely between these areas within the site. | Fulmars have their main breeding period at Fair Isle SPA from April to mid-September. Despite dispersing large distances during the non-breeding period, fulmars will regularly visit their colonies over the non-breeding period and thus will be present at Fair Isle SPA throughout the yearly cycle.<br><br>Fulmars at the Fair Isle SPA nest on grassy slopes and cliff ledges around the coast, amongst boulders on steep hillsides inland, or around stone dykes and ruined buildings.<br><br>Fulmars at the Fair Isle SPA will forage in the offshore waters, often over shelf-break waters. They have a large foraging range, generally 542.3 ±657.9km during the breeding period, though distances of 2890km have been recorded (Woodward *et al.* 2019). Given the extensive foraging range of this species, fulmars from various colonies across the UK could be making use of the marine extension area of Fair Isle SPA, but these marine waters are expected to be particularly important for those breeding at Fair Isle SPA. Fulmars forage both during the day and at night. They are surface feeding predators and scavengers, usually diving only to 5m at most (Edwards *et al.* 2013). |
| Northern gannet | Ensure gannets continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their | Gannets breeding at the Fair Isle SPA will be present from mid-February until the end of September. Tracking work from gannets at Bass Rock, showed that some gannets may still be present until into October, after which they will then depart for their wintering areas in the North Sea or off West Africa.<br><br>Gannets will be widely distributed throughout the Fair Isle SPA waters, but have their main concentration in at the North-west cliffs and stacks. Gannets forage over shelf waters, and in water |

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| | life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to gannets and ensure individuals can move safely between these areas within the site. | closer to shore, depending on where their prey are. Gannets will plunge dive to around 11m, but can then carry out wing-propelled pursuit to deeper depths of around 24m. Gannets have a mean maximum foraging range of 315.2+/- 194.2 km during the breeding period, but the maximum foraging distance recorded can be over 700km (Woodward *et al.* 2019). |
| Razorbill | Ensure razorbills continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.<br><br>***and***<br><br>Avoid significant disturbance to razorbills and ensure individuals can move safely between these areas within the site. | Razorbills will be present during their breeding period at the Fair Isle SPA from March to September. They will then undergo a flightless moult period from mid-August to end of October and may winter in UK waters or move further east to Norway or Denmark (Furness, 2015). It is not known where razorbills from the Fair Isle SPA winter.<br><br>Razorbills at the Fair Isle SPA will nest in crevices in cliffs, often mixing with common guillemots on the same ledges. They may also nest amongst boulders and rocks on grassy slopes or rocky beaches. Razorbills use areas close to the coast as well as offshore waters in which to forage, rest, and carry out other maintenance activities.<br><br>In the breeding period, razorbills have a mean maximum foraging range of 88.7 ± 75.9km (Woodward *et al*. 2019). Razorbills are pursuit divers which make frequent dives of up to 140m, though average dive depth is around 15m (Ropert-Coudert *et al.* 2018). Most dives are under one minute. Razorbills will regularly roost on the sea overnight and may drift with the tide during their rest (Cooper *et al.* 2018). |

| **2c. The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored at Fair Isle SPA.** |
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| This objective seeks to maintain the current extent, quality and distribution of supporting habitats within the site as well as ensure a sufficient food supply within the site. It also recognises however, that the populations of Arctic skua, Arctic tern, puffin, kittiwake, guillemot, shag, and razorbill using the Fair Isle SPA are in unfavourable condition and that this may, in part, be due factors within the SPA. |

The qualifying features require suitable habitat for shelter, roosting, foraging, loafing, moulting and other maintenance activities. The variety, quality, abundance and availability of food resources on which the qualifying features depend is important for ensuring adult fitness, survival and breeding success (including for over-wintering species). The supply of food resources is supported by environmental processes.

In the terrestrial environment, supporting habitats refer to the characteristics of the sea cliffs, beaches, freshwater ponds, relevant to their use by the qualifying features. Supporting processes relates to wider processes such as factors affecting coastal erosion, factors affecting vegetation formation, and nutrient flow into and hydrology of freshwater lochs, all of which will influence the habitat types and prey distribution available for the qualifying features.

In the marine environment, supporting habitats refer to the characteristics of the seabed and water column relevant to their use by the qualifying features. Supporting processes relates to wider oceanographic processes such as up-wellings, tidal flows, hydrological movements which may be necessary for the habitat, and thus affects nutrient cycling and prey distribution.

Maintenance of prey species and their supporting habitats is important to maintain the conditions required to support the qualifying features populations.

Temporary short-term changes in supporting habitat and/or food resources due to human activity may be considered not to compromise the Conservation Objectives within the site provided it can be demonstrated with a high degree of certainty that the populations of any affected qualifying features can fully recover. The species-specific information includes a summary of available information on food resources and where known, the distribution of the key supporting habitats and associated processes within the Fair Isle SPA.

The overall water body condition status relevant to the Fair Isle SPA was assessed as "Good" [7] in 2020. This assessment includes consideration of water chemistry, pollutants, the physical condition of the water body, plant and animal communities, including plankton, and the risk from invasive non-native species.

There is currently insufficient information to provide quantitative advice on the environmental processes associated with the supporting habitats and prey of the qualifying features at the Fair Isle SPA.

| Feature | Site-specific advice | Site-specific information |
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| Arctic skua | Maintain or enhance the extent and distribution of the supporting habitats | Arctic skuas require suitable habitat for breeding, foraging, bathing, and other maintenance activities within this SPA. Arctic skuas require moorland or heathland for nesting habitats at the Fair Isle SPA. Arctic skuas will use the marine waters over which to forage at Fair Isle SPA. |

[7] https://www.sepa.org.uk/data-visualisation/water-classification-hub/

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| | for Arctic skuas within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained and any increase in eutrophication or water turbidity, where this could reduce supporting habitats and/or prey, should be avoided. | Arctic skua mainly feed on a diet of fish, including sandeels, obtained via kleptoparasitism, although they may also forage for themselves. Their diet may also contain small mammals, birds, bird eggs, insect and berries (Birdlife International, 2023).<br><br>The key supporting habitat for Arctic skua at the Fair Isle SPA relates to ensuring suitable nesting habitat. For the marine extension around Fair Isle SPA the supporting processes are not clear. Local changes in wave length, height and frequency may indirectly affect Arctic skuas ability to obtain prey, if changes in the water conditions means their victim capture rates are reduced, and therefore Arctic skuas are less likely to be able to obtain prey via kleptoparasistim in the air. |
| Arctic tern | Maintain or enhance the extent and distribution of the supporting habitats for Arctic terns within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting | Arctic terns require suitable habitat for foraging, bathing, and other maintenance activities within this SPA. Arctic terns forage over the open sea, in nearshore waters and along edges of sandy or rocky shores, tidal flats, and over tide rips or drift lines (Eglington & Perrow, 2014). They tend to forage in water depths of between 10-20m (Schwemmer *et al*. 2009), although foraging mainly takes place where prey is within 20 cm of the surface (Eglington & Perrow, 2014).<br><br>Arctic terns predominantly prey on fish, especially sandeels, clupeids (especially herring and sprat), as well as crustaceans (especially planktonic species), molluscs, and insects (e.g. Chironomidae) (del Hoyo, 1992). Seagrass habitats can be nursery areas for Arctic tern prey (Burkholder *et al.* 2007). |

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| | habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided. | The key supporting processes for Arctic terns at the Fair Isle SPA are tidal cycles, and water flow. Areas with strong water currents are thought to be important as they bring small prey to the surface (Schwemmer *et al*. 2009). Feeding rates are often highest at low tides, where adults are hunting over shallow reefs (Cramp & Simmons, 2004). Further to this, local changes in wave length, height and frequency can directly affect surface feeders like Arctic tern. The highest success in fishing is often in dry, calm weather, declining with increasing wind and rain, while fog and cloud has also been reported to reduce foraging efficiency (Cramp & Simmons, 2004). Capture rates of fish decreased significantly with increasing wind speed in Arctic terns (Bengtson, 1966). The species are reported to perform shallower dives at higher wind speeds. There is uncertainty in the impact turbidity or poorer water quality may have on terns. |
| Atlantic puffin | Maintain or enhance the extent and distribution of the supporting habitats for puffins within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants | Puffins use grassy maritime slopes, boulder scree or cracks in sea cliffs and rocky slopes for nesting. Feathers, grass, other vegetation, or seaweed may be taken into the burrow as burrow lining (Harris & Wanless, 2011). Puffins will use both inshore and offshore pelagic and shelf-waters in which to forage, roost and for other maintenance activities. Foraging is largely restricted to dive depths of up to 70m (Harris & Wanless, 2011).<br>Puffins will use both inshore and offshore pelagic and shelf-waters in which to forage, roost and for other maintenance activities. Foraging is largely restricted to dive depths of up to 70m (Harris & Wanless, 2011).<br><br>Puffin's diet will consist of a number of different pelagic and demersal fish, including: sandeels, clupeids, gadoids, sprat, whiting, saithe, haddock, with typical fish sizes being up to 20cm (Harris & Wanless, 2011). Within UK waters, puffins rely heavily on sandeels as prey with between 60 and 90% of their diet reported to be sandeel throughout the North Sea (Furness, 2002). Breeding success of puffins has been shown to correlate with availability of sandeels (Macdonald *et al.* 2015). Puffins can also prey on planktonic crustaceans, including *Calanus* copepods, euphausids amphipods such as *Parathemisto libellula*; pteropod molluscs; the squid *Illex illecebrosus*; and polychaete worms (Harris & Wanless, 2011). |

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| | where this could reduce supporting habitats and/or prey, should be avoided. | Key prey supporting marine habitats are those suitable for supporting sandeels. Sandeel spend much of their life buried in sand on the seabed, typically in medium or course sands, but they also occur in large shoals in the water, typically 30-50m deep, where the sandeels feed on plankton (Harris & Wanless, 2011).<br><br>The key supporting terrestrial habitats within the Fair Isle SPA for puffins may relate to the availability of and formation of grassy slopes and suitable soil for their burrows. Should erosion of soil occur this could reduce the availability of suitable burrowing habitat for the puffins. In the marine environment, as they are a species that feeds in the water column, they may also be affected by any increase in water turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010). |
| Black-legged kittiwake | Maintain or enhance the extent and distribution of the supporting habitats for kittiwakes within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats | Kittiwakes at the Fair Isle SPA will use steep, coastal cliffs and offshore stacks for nesting. Their nest is made of compacted mud, grass, feathers and occasionally seaweed (Snow & Perrins, 1998). Kittiwakes require access to areas of freshwater for bathing and for roosting they may use manmade walls.<br><br>Kittiwakes use both inshore waters within 1km of their colony for loafing, preening, bathing and other important maintenance behaviours, and further offshore waters and shelf waters for foraging. When fishing, they will often feed in small flocks. Kittiwakes will also use beaches at to moult in large flocks.<br><br>Kittiwake's are omnivorous with a diet consists predominantly of shoaling marine fish and invertebrates (squid and shrimps) obtained just below or under the sea surface. During the breeding season they may also feed on intertidal molluscs, crustaceans and plant matter (del Hoyo *et al.* 1996). At sea during the winter, kittiwakes will also take planktonic invertebrates and often exploit sewage outfalls and scavenge on offal and discards around fishing vessels, particularly when their main prey resources are less abundant (del Hoyo *et al.* 1996). Diet studies from the Isle of May, showed sandeel to be an important prey item, as well as sprat, rockling and gadids (JNCC, 2019).<br><br>Reduction in important prey items such as sandeels, capelin and herring have population level effects on kittiwake such as increased mortality and a reduction in breeding (e.g. Daunt *et al.* 2008; Mitchell *et al.* 2020). Food supplies at different life stages may also affect future reproduction, for example early diet in developing kittiwakes can affect chick survival (Christensen-Dalsgaard *et al.* 2018; Hatch *et al*. 2013). |

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| | and/or prey, should be avoided. | Information is lacking on the supporting processes for kittiwakes at the Fair Isle SPA, but may relate to water quality (nutrients and turbidity) and water flow. |
| Common guillemot | Maintain or enhance the extent and distribution of the supporting habitats for common guillemot within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided. | Guillemots at the Fair Isle SPA require suitable habitat for breeding, foraging, resting, and other maintenance activities. They will use cliff ledges as their nesting habitat. Guillemots use areas close to the coast as well as offshore waters in which to forage, rest, and carry out other maintenance activities. Guillemots forage both at the seabed (demersal) and within the water column (pelagic) up to 200m, primarily during daylight hours (Wakefield *et al.* 2017).<br><br>Breeding guillemot feed on small schooling fish including sandeels, clupeids, capelin, sprats and juvenile herring and cod (Wakefield *et al.* 2017). They may also consume molluscs, marine worms, squid, crustaceans and amphipods. Their non-breeding season diet is not as well studied, but thought to be similar to that during the breeding period. Reduction in quantity and quality of prey including sandeels and capelin have been found to cause negative effects on guillemot survival and breeding (e.g. Eriksstad *et al.* 2013; Wanless *et al.* 2018).<br><br>The key supporting habitats for guillemots at Fair Isle SPA will relate to the availability of suitable cliff-nesting habitat. As they are a species that feeds in the water column, they can be potentially affected by any increase in turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010). Guillemots have been shown to show a weak preference for frontal regions and for substrate containing a relatively low proportion of gravel (Wakefield *et al.* 2017). Guillemots have also been observed to forage in riptides (Wanless *et al.* 1990). Studies have also demonstrated guillemots foraging in areas at fronts between thermally distinct bodies of water (BirdLife International, 2022). |

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| European shag | Maintain or enhance the extent and distribution of the supporting habitats for shags within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided. | Shags require suitable habitat for breeding, foraging, loafing, bathing, and other maintenance activities within the Fair Isle SPA. Shags prefer rocky coasts with deep, clear water and forage over sandy and rocky seabeds (del Hoyo *et al.* 1992).<br><br>In the Fair Isle SPA shags will nest on ledges, crevices or small caves, building nests from twigs, seaweed, and occasionally from man-made sources. In the marine extension waters, shags will feed in the nearshore environment. As such, foraging areas tend to coincide with areas of sandy benthic sediment, and occur where depth is less than 80m (Daunt *et al.* 2015). Shags dive to 10-40m, though dives of more than 50m have been recorded (Daunt *et al*. 2015). Shags will also forage in sheltered bays and channels, and will generally avoid estuaries, shallow or muddy inlets and fresh or brackish waters (Wanless & Harris 1997; BirdLife International, 2022). They will also forage within kelp forests (Kelly, 2005).<br><br>Shags are predominantly benthic feeding piscivores, taking a wide range of demersal, benthic and pelagic fish. Sandeels are their dominant prey species (Wanless & Harris, 1997). Other fish of the families Gadidae, Clupeidae, Cottidae, and Labridae are also consumed. However polychaetes, cephalopods, other molluscs and small benthic crustaceans have also been recorded in their diet (Barrett *et al.* 1990; del Hoyo *et al.* 1992).<br><br>The key supporting processes for shags at Fair Isle SPA are water quality (nutrients and turbidity), tidal cycles, and water flow. Shags have been recorded commonly feeding in areas with strong tidal flow (Wanless *et al.* 1991). The fact that shags tend to avoid muddy areas for foraging suggests turbid waters may be harder to forage in due to a decrease in visibility to see and catch prey. Therefore, any increase in turbidity in waters within this SPA could affect the shags. Strong winds have also been noted to negatively affect the foraging efficiency of this species (Lewis *et al.* 2015), and thus having sheltered areas closer to the shore will be important for shags. |
| Fair Isle wren | Maintain the extent and distribution of the supporting habitats for Fair Isle wren within the site.<br><br>***and*** | Fair Isle wren require suitable habitat for foraging and nesting. Wren will forage in a wide variety of habitats but Fair Isle wren almost exclusively make use of the coastal cliff tops.<br><br>Fair isle wren predominantly feed on invertebrates such as spiders and beetles but will also take small vertebrates such as small fish and tadpoles where available. |

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| | Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. | Fair Isle wrens are mainly confined to the island's cliffs, foraging on kelp-strewn beaches. The two main factors postulated as affecting their population are the increase in abundance of fulmars (which has coincided with a decline in Fair Isle wrens), and prolonged stormy weather (Aspinall and Aspinall 2011).<br><br>The supporting processes for Fair Isle wren may be indirectly linked to what their prey species require. In the Fair Isle SPA the availability of suitable nesting habitat will also be important. |
| Great skua | Maintain the extent and distribution of the supporting habitats for great skuas within the site.<br><br>***and***<br><br>Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.<br><br>***and***<br><br>Existing water quality should be maintained and any increase in eutrophication or water turbidity, where this could reduce supporting habitats and/or prey, should be avoided. | Great skuas nest on moorland and hillsides throughout the Fair Isle SPA. They also use lochans and freshwater pools within the SPA to bathe communally. They use the surrounding marine waters and further offshore waters for foraging.<br><br>Great skuas are opportunistic, diurnal foragers with a wide prey base including adults, chicks and eggs of other seabird species, terrestrial mammals, pelagic fish, demersal fish from fishery discards, prey gained from kleptoparasitim of other seabirds, and carrion (Furness, 1987). Where sandeels are available, adults preferentially feed their chicks on these high quality prey item rather than, for example, fishery discards such as haddock or whiting (Furness, 1987). Colony location may affect prey type consumed: in one study comparing pellets it was found that on St Kilda 44-65% of great skua pellets contained seabirds, compared to on Foula where only 12% of pellets did (Phillips *et al.* 1997), though it is not known if this pattern remains in recent years.<br><br>Great skuas often feed in groups, especially when shoaling fish are near the surface. They can dip under the surface or grab from the surface but don't generally dive under (Snow & Perrins, 1998), though they can submerge up to 0.5m (Furness, 1987).<br><br>The supporting processes for great skuas may be indirectly linked to what their prey and host species require. In the Fair Isle SPA the availability of suitable nesting habitat will also be important. |
| Northern fulmar | Maintain the extent and distribution of the | Fulmars require suitable habitat for breeding, foraging, loafing, and other maintenance activities within Fair Isle SPA. Fulmars at the Fair Isle SPA nest on grassy slopes and cliff ledges around the coast |

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| | supporting habitats for fulmars within the site.<br><br>***and***<br><br>Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.<br><br>***and***<br><br>Existing water quality should be maintained and any increase in eutrophication or water turbidity, where this could reduce supporting | amongst boulders on steep hillsides inland, or around stone dykes and ruined buildings. Fulmars at the Fair Isle SPA will forage in the offshore waters, often over shelf-break waters, feeding within 5m of the surface.<br><br>Fulmars forage both during the day and at night, taking a wide range of prey, particularly small fish, zooplankton (especially copepods and amphipods), shrimp, squid, jellyfish, crustaceans, offal from fisheries, and carrion (BirdLife International, 2019).<br><br>The key supporting processes for fulmars at Fair Isle SPA may relate to shelf-breaks, where there are areas of high biological productivity due to the oceanic thermal fronts (Edwards *et al.* 2013). |
| Northern gannet | Maintain the extent and distribution of the supporting habitats for northern gannet within the site.<br><br>***and***<br><br>Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. | Gannets require suitable habitat for foraging, loafing, and other maintenance activities within this SPA. Gannets forage over shelf waters, and in water closer to shore. Gannets will plunge dive to around 11m, but can then carry out wing-propelled pursuit to deeper depths of around 24m within the water column.<br><br>Gannets have a flexible diet and are capable of exploiting a wide variety of pelagic fish prey, including: sandeel, haddock, whiting, blue whiting, cod, saithe, mackerel, sprat, herring and red gurnard. Gannets may also take advantage of fishery discards, though the level of this will differ depending on the individual (Votier *et al.* 2010). Prey taken may differ markedly in size from 0-group sandeels (mean = 7.8 cm) to haddock (29.1 cm) and trout (34.0 cm) (Hamer *et al.* 2000).<br><br>Information is lacking on the supporting processes for gannets at the Fair Isle SPA, but may relate to water quality (nutrients) and water flow. |

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| | ***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided. | |
| Razorbill | Maintain or enhance the extent and distribution of the supporting habitats for razorbill within the site.<br><br>***and***<br><br>Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover.<br><br>***and***<br><br>Existing water quality should be maintained any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats | Razorbills at the Fair Isle SPA require suitable habitat for breeding, foraging, resting, and other maintenance activities. They may use crevices and ledges on cliffs, boulders, rocks on grassy slopes, or rocky beaches for their nesting habitat. They will use inshore waters for foraging, but may also feed further offshore, particularly favouring shelf waters due to their productivity (Linnebjerg *et al.* 2013). Razorbills will also use the marine waters for roosting overnight and will drift with the tide during their rest (Cooper *et al.* 2018).<br><br>Razorbills are a pursuit diver that make frequent, shallow dives in the pelagic zone (Thaxter *et al.* 2010, Linnebjerg *et al.* 2013). They have a foraging depth of up to 140m (Jury, 1986) though average dive depth is 15m (Ropert-Coudert *et al.* 2018) and most dives are under 1 minute (Ropert-Coudert *et al.* 2018). Razorbills will feed on small fish (e.g. sandeels, capelin, sprat, juvenile herring and cod), crustaceans and polychaetes (Wakefield *et al.* 2017). They may also steal fish from puffins at certain colonies (Snow & Perrins, 1998). Razorbill distribution has been linked to substrate type, relating to their main prey item, the sandeel (Wakefield *et al.* 2017).<br><br>The key supporting habitats for razorbill at Fair Isle SPA in the terrestrial environment may relate to suitable cliff-nesting habitat. In the surrounding waters by Fair Isle SPA supporting processes may include water quality (nutrients and turbidity), tidal cycles, water temperature and water flow. As they are a species that feeds in the water column, they can be potentially affected by any increase in turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010). Razorbills tend to use areas where cool and warmer waters mix near the sea surface (Wakefield *et al.* 2017). |

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| | and/or prey, should be avoided. | |

**Annex 2. Supporting information**

***Factors determining the potential for feature recovery.***

| Feature | Factors determining the potential for feature recovery |
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| **Arctic skua** | Arctic skua estimated generation length is 11.2 years and age of first breeding is 4 years old (Bird *et al.* 2020). Average lifespan is 12 years (SWT, 2019) and maximum lifespan is thought to be around 31 years (Bird *et al.* 2020). As a long-lived species, breeding adult Arctic skuas will favour their own survival over a successful reproductive attempt. As such, in time of poor food conditions, the adults may abandon their chicks in order to feed themselves instead. Arctic skuas have a single brood. Normal clutch size is 2 eggs, although10-20% of pairs lay a single egg (Furness 1987). They may relay if they lose the eggs early in the season (Furness 1987) and may skip a breeding year (missed breeding rate of 0.030) (Horswill & Robinson, 2015). Incubation takes 25-28 days and chick rearing 25-30 days (Snow & Perrins, 1998). Adult survival rates have been estimated at 0.895 (Bird *et al.* 2020) and average productivity is 0.487 (Horswill & Robinson, 2015).<br><br>Arctic skuas breeding in GB waters migrate in winter to South American and Africa (Snow & Perrins, 1998). Pressures in these wintering grounds could limit potential for populations to recover from impacts arising in breeding areas. Skuas are site faithful to their territory (Furness, 1987). Such high site fidelity may limit individual ability to adapt to changes within breeding areas and hence potential for population recovery from perturbations.<br><br>As their main foraging strategy is kleptoparasitism of other seabird species such as terns, auks, and small gulls, any decrease in their host's populations could have a subsequent effect on the Arctic skuas. Arctic skuas are highly reliant on sandeels for successful breeding attempts and, unlike the larger great skua, do not appear to be able to switch to other prey items readily. Recent tracking has shown that when food supply is low they may switch from kleptoparasitism to foraging at sea, however it is not yet known the extent to which they can do this (Humphreys *et al.* 2017). |
| **Arctic tern** | Estimate generation length for Arctic terns is 11.2 years, with maximum known longevity being 34 years (Bird *et al.* 2020). Age of first breeding is between 3-4 (Bird *et al.* 2020). Adult survival rates have been estimated as 0.9 (Bird *et al.* 2020) and average productivity as 0.380 (Horswill & Robinson, 2015). Clutch size is 1-3 eggs, with incubation taking 20-24 days and chick rearing 21-24 days (Snow & Perrins, 1998). After fledging, the juvenile terns will feed for themselves, but will usually stay with their parents for a further month or two, until the terns migrate (RSPB, 2019). Any effect on adult mortality can potentially have serious effects on breeding numbers. As a long-lived seabird species, the adult will balance parental investment into their current breeding attempt with their own need to survive, and future reproductive attempts.<br><br>Arctic tern has a circumpolar breeding range across the Arctic and subarctic regions of Europe, Asia and North America as far south as Northern France and Massachusetts (U.S.A.). Arctic terns in the UK are transequatorial migrants, wintering throughout the Southern Ocean to the edge of the Antarctic ice and the southern tips of South America and Africa (BirdLife International, 2019). It is during the non-breeding period when Arctic terns will carry out their primary moult (Voelker, 1997). Pressures in these wintering or passage grounds could limit potential for populations to recover from impacts |

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| | arising in breeding areas. Tern species show a low degree of site faithfulness from one breeding season to the next and in response to predation, disturbance or habitat change the tern colony may move to another site (Ratcliffe, 2004).<br><br>Arctic terns are a specialised forager and due to their reliance on sandeel as their main prey item, they are thought to be vulnerable to changes of sandeel abundance, distribution or quality (Furness & Tasker, 2000). |
| **Atlantic puffin** | The estimated generation length for puffins is 14.2 years (Bird *et al.* 2020). Puffins can live up to around 40 years old (Fransson *et al.* 2010), though more commonly to less than 30 years (Harris & Wanless, 2011). Most birds do not visit their breeding colony until 2-3 years old (Snow & Perrins, 1998) and age at first breeding is usually 6 years old (Bird *et al.* 2020). Puffins have one clutch per year with a single egg (Snow & Perrins, 1998), meaning they have a low reproductive rate. This means any effect which causes a decline in numbers could limit the ability for the population to recover. Young leave their burrow at night and make their way to the sea when ready to fledge (Snow & Perrins, 1998), which can be a vulnerable time for the fledged puffins. Adult survival rates have been estimated at 0.913 (Bird *et al.* 2020) and average productivity rate is 0.617 (Horwsill & Robinson, 2015). Any effect on adult mortality can potentially have serious effects on breeding numbers. As with other long-lived seabird species, the adult will balance parental investment into their current breeding attempt with their own need to survive, and future reproductive attempts.<br><br>In winter, puffins use marine waters outwith their breeding colony waters with some individuals reaching the Azores, Canary Islands, north-west Africa, the western Mediterranean, and the west Atlantic, though many remain within the North Sea (Harris & Wanless, 2011). Pressures at their wintering grounds or during their flightless moult period between February and mid-March may have subsequent consequences for their breeding period. In spring, birds will assemble in large rafts on the water pre-breeding, where courtship takes place, close inshore near their breeding areas (Snow & Perrins, 1998). Disturbance during this time may have consequences for the breeding season. Puffins display a high degree of nest site fidelity and will often use the same burrows across different years (Harris & Wanless, 2011), which may limit individual ability to adapt to changes within these areas and hence potential for population recovery from perturbations.<br><br>Puffins are pursuit divers and are dependent on high quality fish, such as juvenile sandeels or herring, for successful chick rearing (Wanless *et al.* 2005; Harris *et al.* 2007; Miles *et al.* 2015). Their specialised tongue enables them to capture several fish in one dive and if intended for young can be stacked across the beak (Snow & Perrins, 1998). In years of poor sandeel availability they have demonstrated an ability to forage for alternative prey resources (Harris *et al.* 2007; Wanless *et al.* 2005), however this switch of prey resource may have a consequence on productivity or adult survival. |
| **Black-legged kittiwake** | Kittiwake estimated generation length is 9.8 years and age of first breeding is 4 years old (Bird *et al.* 2020). Maximum age recorded is around 29 years (Fransson *et al.* 2010). Kittiwake clutch size is 2 (1-3) (Snow & Perrins, 1998). Fledglings typically depart colonies between late July and mid-August, dispersing rapidly from colonies, leaving the area about 10 days on average after their first flight (Coulson, 2011). Adult survival rates vary with period and colony but range from 0.8-0.93, with an average survival of 0.854 (Coulson, 2011; Horswill & Robinson, 2015). Any effect on adult mortality can potentially |

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| | have serious effects on breeding numbers. As a long-lived seabird species, the adult will balance parental investment into their current breeding attempt with their own need to survive, and future reproductive attempts.<br><br>A wide-scale tracking study found that the vast majority of adults from North Atlantic colonies appear to winter in the west Atlantic between Newfoundland and the mid-Atlantic ridge with the relatively small numbers wintering in the North Sea and west of the British Isles coming mostly from colonies in the British Isles or in the Barents Sea (Furness, 2015). Feeding aggregations may be seen around the Scottish coast until late October/early November (Forrester *et al.* 2007). Numbers of kittiwakes passing through UK waters in spring and autumn vary strongly from year to year apparently in relation to weather conditions (Furness, 2015). Pressures in these wintering or passage grounds could limit potential for populations to recover from impacts arising in breeding areas.<br><br>Adult moult may begin during the breeding season but in general will occur after breeding. This species will often moult in large flocks of several thousand individuals on sandy beaches between the breeding grounds and the open sea (BirdLife International, 2019). Any pressure (e.g. disturbance) to these moulting flocks may have subsequent effects on their energy expenditure and hence their survival.<br><br>Kittiwakes are surface feeders and are therefore limited to those prey found in the upper 1m of the sea (Snow & Perrins, 1998). Kittiwakes have a high reliance on sandeel as their main prey (Daunt *et al.* 2008), and as such are judged to be one of the most vulnerable species in terms of breeding success in relation to sandeel abundance (Furness & Tasker, 2000). This means they may be less resilient to a loss of sandeel prey resource, and thus their recovery would be compromised. |
| **Common guillemot** | Guillemot estimated generation length is 14.8 years and age of first breeding is 4 years (Bird *et al.* 2020). Guillemots can live in excess of 40 years (Fransson *et al.* 2010), though the average lifespan is likely to be less than 25 years. Guillemots lay a single egg and will not relay if the egg is lost (Snow & Perrins, 1998), meaning they have a slow reproductive rate. As with many species, productivity of first time breeders is relatively low, and for guillemots stabilises from the fifth breeding attempt (Crespin *et al.* 2006). When ready to fledge the chick will leave the nest site and joins the male of the pair on the sea, where they then travel further out to sea together and remain close for around two months (Harris & Wanless, 2004). In this post-fledgling period, the chicks will be vulnerable to predation at this lifestage being less able to escape predators (from late July-end of August during fledging). Adult survival is estimated as being 0.935 (Bird *et al.* 2020) and average productivity 0.672 (Horswill & Robinson, 2015). Any effect on adult mortality can potentially have serious effects on breeding numbers. As with other long-lived seabird species, the adult will balance parental investment into their current breeding attempt with their own need to survive, and future reproductive attempts.<br><br>The majority of guillemots in UK waters during the non-breeding season are likely to be from UK colonies (Furness, 2015). Few adults move beyond UK waters, although immatures range more widely during the non-breeding season (Furness, 2015). Non-breeding adults tend to remain near their breeding colonies throughout the year and attend their nest ledges, except during their flightless moult period from beginning of August to mid-October. |

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| | Pressures during this moult period, where adults will be flightless for 1-2 months, could have a subsequent effect on reproduction or survival.<br><br>Guillemots are not particularly agile in the air and they find take-off from water difficult (Bédard, 1985), which may limit their ability to avoid e.g. fast moving vessels. A guillemot's foraging technique means that they only carry one fish back to their chick at a time, whereas other auk species can carry multiple fish. This limits the quantity of prey they can bring back to their chick each day. As guillemots can dive deeply, they can feed both at the seabed (on demersal prey) and in the water column (on pelagic prey) (Wakefield *et al.* 2017), meaning they may have more flexibility in the prey items they can forage on, depending on their availability. Guillemots, as with other auk species, have a high wing loading, meaning that there is a high energetic cost of flight (Thaxter *et al.* 2010). This may mean if they have to travel further to find food they may suffer energetically (Masden *et al.* 2010). |
| **European shag** | Estimated generation length is 9.2 years and maximum known longevity is around 30 years (Bird *et al.* 2020). Age at first breeding is normally at 2 or 3 years old (Wanless & Harris, 2004). Clutch size is usually 3 (1-6) eggs and they will only have one brood per breeding season (Cramp & Simmons, 2004). Their pre-laying period is in March, their egg incubation period from April-June and takes 30-31 days; and their chick rearing period is between June-August and can take 48-58 days (Cramp & Simmons, 2004). Shags often defer breeding for a year if local conditions are unfavourable (Wanless & Harris, 2004). Adult survival rates have been estimated as being between 0.85 (Bird *et al.* 2020) to 0.88 per annum for well-studied Isle of May birds (Wanless & Harris, 2004). Average productivity is estimated as 1.303 (Horswill & Robinson, 2015). Recruitment rates are relatively low which means any effect which causes a decline in numbers could limit the ability for the population to recover. Survival and productivity are thought to be affected by the amount of available prey (Wanless & Harris, 2004). Any effect on adult mortality can potentially have serious effects on breeding numbers.<br><br>European shags are a resident UK species and present around the UK coastline throughout the year. In winter, numbers of shags move short distance migrations within and between Scotland and England and a few cross the North Sea to Norway. The winter distribution closely resembles that during the breeding season, but not localised to breeding colonies (Goodship & Furness, 2019). Immatures may disperse over short distances post-breeding (del Hoyo *et al.* 1992). Adults return to breeding sites from February, with their main breeding period being from March-end of September and thus their non-breeding period is from late September-early February. They are highly site faithful, both in the breeding period (Aebischer *et al.* 2008) and in their non-breeding period with preferred roost sites (Grist *et al.* 2014), which may limit individual ability to adapt to changes within these areas and hence potential for population recovery from perturbations.<br><br>Shags are predominantly benthic feeding piscivores (Wanless *et al.* 1991) and whilst their diet is largely associated with sandeels, they have a wide prey base of demersal and pelagic fish. At some colonies (Isle of May), shags have demonstrated an ability to switch prey items in times of poor sandeel availability, but it is not known if this has population consequences for the shags, or indeed whether the ability to prey switch is possible in all locations (e.g. more northern locations) (Daunt *et al.* 2015). The available data on shag feeding habitat suggest that, within the inshore zone as a whole, the species is fairly plastic in its habitat requirements (BirdLife International, 2022). |

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| | Shag plumage is different to other seabird species in that it requires a 'wing-drying' process after foraging/diving, as their feathers are not fully water-repellent. They require longer period of 'wing drying' depending on the weather conditions and how long they had been under water for (Debout *et al.*, 1995). Their lack of complete waterproofing may explain why they are so susceptible to increased storminess and extreme weather which can lead to mass mortality 'wreck' events for shags, particularly in the winter, (Bustnes *et al.* 2013; Frederiksen *et al.* 2008). Shags also tend to nest further down the cliff, making them vulnerable to summer storms when large waves hit the coastlines, potentially resulting in nests lower down becoming washed out or swept away. Extreme weather events in the summer periods with increased high winds and rainfall have previously resulted in widespread breeding failures (Aebischer, 1993). |
| **Fair Isle wren** | Estimated generation length is 2 years with their age of first breeding typically at 1 year (BTO ringing data). This is a short generation length which could make this species more resilient to factors affecting their population. Their maximum lifespan has been recorded as around 7 years (BTO ringing data). Wren typically have two broods with a clutch size of on average 5-6 eggs.<br><br>Adult survival rates and productivity of the Fair Isle wren are unknown.<br><br>Fair Isle wren are resident in Fair Isle (Fair Isle Bird Observatory Report, 2014) and are endemic to the island making them vulnerable to complete extinction as a sub-species.<br><br>The Fair Isle wren are broadly limited in their distribution to areas around the foreshore and are dependent on the dead seaweed cast up by the tide for suitable foraging. Their diet includes sandhoppers and other crustaceans, and the larvae of flies. It is considered that the dependence of Fair Isle wren on these intertidal areas could make them vulnerable to change. |
| **Great skua** | Estimated generation length for great skua is 15.0 years with their age of first breeding being between 6-7 years (Bird *et al.* 2020). This is a long generation length which makes this species less resilient to recovery from factors which either directly or indirectly effect their population. Their maximum lifespan has been recorded as around 33 years (Bird *et al.* 2020). Great skuas have one brood with a clutch size of normally 2 eggs (10-20% of pairs lay a single egg); they may relay if they lose their eggs early in the season (Furness 1987). Adult survival rates have been estimated at 0.915 (Bird *et al.* 2020) and average productivity is 0.651 (Horswill & Robinson, 2015). The high adult survival suggests that any effect on adult mortality can potentially have serious effects on population numbers.<br><br>Great skuas are a migratory species with the main wintering distribution ranging from the Celtic Sea to southern Europe and to the coast of northwest Africa (Furness, 2007). Few birds remain in the North Sea in winter. The Bay of Biscay is of particular importance for wintering birds (Magnusdottir *et al.* 2012). Great skuas from the UK breeding colonies that migrate from the Celtic Sea to the coast of West Africa may be subject to pressures there that could limit the potential for populations to recover from impacts arising in wintering areas (e.g. bycatch over winter period). Skuas are site faithful to their territory (Furness, 1987); such high site fidelity may limit individual ability to adapt to changes within breeding areas and hence potential for population recovery from perturbations. |

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| | Great skuas are known to be opportunistic foragers who will kleptoparasitise other seabirds for their food as well as being a predator and a scavenger (Furness, 1987). Great skuas have a wide prey base (Furness, 1987) which may mean they are more resilient to changes in particular prey populations and abundance. They have been known to be able to increase predation on other seabirds in times of poor fish supply, showing they have a degree of foraging plasticity. |
| **Northern fulmar** | Estimated generation length is 25.3 years (Bird *et al.* 2020), one of the longest in any bird species, meaning they may be less resilient to any negative effects on their population. Fulmars generally begin breeding ~10 years old (Dunnet, 1991) and can continue to breed into old age; some individuals still recorded as breeding in their late 40s (P.Thompson, unpub.data). Maximum recorded longevity is 51 years (Bird *et al.* 2020). Reproduction rates in fulmars are slow with a single egg being laid per year. Fulmars may not breed every year (Ollason & Dunnet, 1988), deferring by at least a year if poor food conditions exist such that the adult cannot reach good body condition to breed, or if the bird's partner has not returned and it needs to establish a new partnership. Adult survival rates have been estimated at 0.971 (Bird *et al.* 2020), one of the highest of all seabird species, and average productivity as 0.419 (Horswill & Robinson, 2015). Changes in adult survival rates are most likely to drive population change.<br><br>The fulmar non-breeding population will be made up of individuals from many different colonies. Tracked birds from Scotland disperse during the non-breeding period to the West Atlantic, to the Labrador Sea, across to the Barents Sea and northern Norway, to the west of Ireland, and some may remain in North Sea waters (Quinn, 2014). There are sex differences in foraging such that female fulmars tracked from Scotland travelled further on average and towards the West Atlantic, compared to males which on average remained closer to the colony over the non-breeding period (Quinn, 2014). There therefore may be different pressures in the wintering grounds for females and males. Despite dispersing large distances in the non-breeding period, from November onwards fulmars will regularly visit their breeding colonies; from January onwards numbers will increase at the colony (Quinn, 2014). In April, breeding fulmars undertake a pre-laying exodus (Macdonald, 1977), an important period of foraging to ensure body condition is ready for the energetically expensive egg laying period. Fulmars may be particularly sensitive to disturbance during their egg laying period, and may abandon their nest if disturbed, leaving the egg vulnerable to predation. During chick-rearing it is common for both pair members to forage away from the nest (Mallory *et al.* 2008), leaving the chick to defend itself with its ability to expel oil and vomit. Fulmars are highly site faithful, which may limit individual ability to adapt to changes within these areas and hence potential for population recovery from perturbations. |
| **Northern gannet** | Estimated generation length of gannets is 15.0 years and the maximum longevity recorded is 37.4 years (Bird *et al.* 2020). Age of first breeding is 5 years old (Horswill & Robinson, 2015). Northern gannets lay a single egg; incubation is 42-46 days and chick rearing 84-97 days (Snow & Perrins, 1998), one of the longest chick rearing periods of any seabird species. Chicks fledge with large fat stores and begin migration by swimming, independent from their parents (Wanless, 2002) until their fat load is reduced. Their productivity is estimated at 0.700 (Horswill & Robinson, 2015). Local productivity rates have been linked to parental experience and increase |

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| | sequentially between the first and the fourth breeding attempt (Nelson, 2010). Adult survival is estimated as being 0.940 (Bird *et al.* 2020), one of the highest of all seabirds. Wanless *et al.* (2006) found that about 30% of young survive to an age of four years with annual survival over the first four years of life increasing gradually from 0.424 to 0.895 before reaching this adult value. Any effect on adult mortality can potentially have serious effects on breeding numbers.<br><br>Gannets leave their colonies mainly between August-October, with their subsequent migration taking up to four weeks to complete, as birds spend time sitting on the water or foraging locally rather than travelling consistently towards their goal (Kubetzki *et al.* 2009). Gannets from Bass Rock, Scotland have been tracked to their wintering grounds further south in the southern North Sea and English Channel, the Bay of Biscay and Celtic Sea, in the Mediterranean Sea and off West Africa (Kubetzki *et al.* 2009) Pressures in wintering grounds (e.g. entanglement in fishing gears) could limit potential for populations to recover from impacts arising in summer foraging areas.<br><br>Gannets have the ability to forage large distances during the breeding period (Woodward *et al.* 2019) and have a wide prey base, meaning they may be more resilient to changes in prey abundances close to their breeding colonies. Spatial partitioning of foraging grounds among breeding adults from different colonies, as revealed by tracking data, (Wakefield *et al*. 2013) may mean that there is some limitation in where they will forage.<br><br>Newly fledged gannets may be potentially vulnerable (e.g. to collision or pollution) when initially moving away from their natal colonies by swimming. However, given high natural mortality rate among juveniles, it is changes in adult survival rates that are most likely to drive population change (Wanless *et al*. 2006). |
| **Razorbill** | Estimated generation length of razorbills is 16.4 and they are a long-lived species, having been recorded to live up to 42 years old (Bird *et al.* 2020). Razorbills first breed around 5 years old (Horswill & Robinson, 2015) and, as with other auks, only lay 1 egg (Snow & Perrins, 1998). Razorbills may defer breeding for a year when conditions are not favourable. Adult survival rates have been estimated at 0.906 (Bird *et al.* 2020) and productivity as 0.570 (Horswill & Robinson, 2015). As with other long-lived seabird species, the adult will balance parental investment into their current breeding attempt with their own need to survive, and future reproductive attempts.<br><br>Razorbills breed around the north Atlantic in eastern North America, Greenland, the White Sea, Norway, Denmark, Iceland, Faroe Islands, GB, Germany and France (BirdLife International, 2019; Furness, 2015). Razorbills wintering in UK waters are thought to derive mainly from breeding populations in the UK, Iceland, Faroe Islands and Norway (Furness, 2015). Scottish breeding razorbills are thought to move east to southwest Norway and Denmark, or the southern North Sea to winter (Furness, 2015). Pressures in these wintering grounds, especially during their vulnerable flightless moult period (from mid-August-end of October), could limit potential for populations to recover from impacts arising in breeding areas.<br><br>Nest site fidelity has been shown to be high in razorbills (Harris & Wanless, 1989), which may limit individual ability to adapt to changes within their breeding areas, and hence potential for population recovery from perturbations. |

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| | Razorbills are pursuit divers which tend to make frequent, shallow dives in the pelagic zone (Thaxter *et al.* 2010; Linnebjerg *et al.* 2013). Razorbills will regularly roost on the sea overnight and will drift with the tide during their rest (Cooper *et al.* 2018), which may make them more vulnerable to pressures that occur during the night. Highest rates of feeding for chicks have been recorded at dawn (Conder, 1950), suggesting this is a particularly important time for them to commute between foraging grounds and their breeding colony. Razorbills, as with other auk species, have a high wing loading, meaning that there is a high energetic cost of flight (Thaxter *et al.* 2010). This may mean if they have to travel further to find food they may suffer energetically (Masden *et al.* 2010). |

## Annex 3: Glossary for Conservation Objectives and References

***Glossary***

| Conservation Objective term | Definition |
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| Distribution | The "distribution" is how the qualifying feature is spread out within the site. |
| Favourable condition | This refers to the assessed condition of a feature through Site Condition Monitoring. Features considered to be in favourable condition for the purposes of these Conservation Objectives are those that have an assessed condition of either:<br>• Favourable declining - The attribute targets set for the natural feature have been met, but evidence suggests that its condition will worsen unless remedial action is taken.<br>• Favourable Maintained - the attribute targets set for the natural features have been met, and the natural feature is likely to be secure on the site under present conditions.<br>• Favourable Recovered - the condition of the natural feature has recovered from a previous unfavourable condition, and attribute targets are now being met. |
| Generation length | Generation length is "the average age of parents of the current cohort". Generation length therefore reflects the turnover rate of breeding individuals in a population (IUCN, 2019). |
| Maintain | Where a qualifying feature of the SPA is assessed as being in favourable condition the conservation objective is 'maintain'. This means that the various attributes of the feature should be kept at that favourable level. This can include increasing/improving condition as well, but not a permanent decline. |
| Marine birds | This term encompasses true seabirds and waterfowl (seaducks, divers, and grebes). |
| Metapopulation | A group of connected populations of a species within a defined area, where the individual populations may interact with one another. |
| Restore | Where a qualifying feature of the SPA is assessed as being in unfavourable condition the conservation objective is 'restore'. This means that the various attributes of the feature should be returned to the favourable level by increasing/improving condition. |
| Site integrity | The integrity of a site is defined in general terms as the coherence of its ecological structures and function, across its whole area, which enables it to sustain the habitat, complex of habitats and and/or the levels of populations of the species for which it was designated. |
| Site reference population | This refers to the estimated population figure for the site and should be used to form the basis of carrying out HRAs. In most cases, the site reference population will be the baseline population (figure at designation). However, where recent surveys show a population to have increased or stayed stable, the current population is considered the most appropriate population figure to use for HRA's. |

| Conservation Objective term | Definition |
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| Supporting habitats and processes | This includes the following environmental conditions (but is not limited to) which are important for maintaining/restoring the protected features, e.g. hydrography and supporting water currents, chemical water quality parameters, suspended sediment levels, radionuclide levels. |
| Unfavourable condition | This refers to the assessed condition of a feature through Site Condition Monitoring. Features considered to be in unfavourable condition for the purposes of these Conservation Objectives are those that have an assessed condition of either:<br>• Unfavourable recovering - One or more of the attribute targets have not been met on the site, but management measures are in place to improve the condition.<br>• Unfavourable no change - One or more of the attribute targets have not been met, and recovery is unlikely under the present management and activity on the site.<br>• Unfavourable declining - One or more of the attribute targets have not been met, evidence suggests that condition will worsen unless remedial action is taken. |

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