NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Conservation and Management Advice

EAST CAITHNESS CLIFFS SPA AND MPA

UK SITES: 9001182 AND 555560462

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This document provides advice to Public Authorities and stakeholders about the activities that may affect the protected features of the East Caithness Cliffs Special Protection Area (SPA) and East Caithness Cliffs Nature Conservation Marine Protected Area (NC MPA). 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 about any activities/operations which may cause deterioration of the habitats or species, or disturbance of species protected in the SPA, and the Conservation Objectives for the site.

It also provides advice from NatureScot under Section 80 of the Marine (Scotland) Act to public authorities as to matters which are capable of damaging or otherwise affecting the protected features of Nature Conservation MPAs, how the Conservation Objectives of the site may be furthered or their achievement hindered, and how the effects of activities on MPAs may be mitigated.

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 East Caithness Cliffs Special Protection Area (SPA) and the East Caithness Cliffs Nature Conservation Marine Protected Area (NC MPA), and it is divided into eight main sections. The introduction in section 2 gives an overview of the East Caithness Cliffs SPA and NC MPA and their 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 and NC MPA. Section 4 describes the protected features and their condition, and section 5 introduces the Conservation Objectives for the sites. 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 East Caithness Cliffs SPA and NC MPA Conservation Objectives. Annex 2 provides supporting information relating to the protected features.

Throughout this document the term Special Protection Area (SPA) or Nature Conservation MPA is used in relation to the site name (East Caithness Cliffs SPA, or East Caithness Cliffs NC MPA) and 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, and black guillemots that the protected areas have 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 designations.

2 Introduction

2.1. Purpose statement

The East Caithness Cliffs SPA has been designated to protect eight species of breeding seabirds, breeding peregrine, and their supporting habitats. The East Caithness Cliffs NC MPA has been designated to protect breeding black guillemot. By doing so these designations contribute 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 conservation of all the protected features within the East Caithness Cliffs SPA and NC MPA contributes towards the OSPAR MPA network in the North-East Atlantic.

The main purpose of the East Caithness Cliffs SPA and NC MPA is to contribute towards the Favourable Conservation Status of the protected features in the Marine Atlantic Biogeographic Region.

2.2. Conservation benefits

The conservation benefits for the East Caithness Cliffs SPA and NC MPA are:

- Protecting an important population of peregrines (an Annex 1 rare and vulnerable species) and being one of the most suitable sites for peregrine in Great Britain.
- Protecting internationally important numbers of seabirds during the breeding season including: common guillemot (approximately 10% of the GB population), razorbill (approximately 11% of the GB population), herring gull (approximately 6% of the GB population), black-legged kittiwake (approximately 7% of the GB population), European

shag (approximately 6% of the GB population), great black-backed gull (approximately 4% of the GB population), cormorant (approximately 3% of the GB population) and fulmar (approximately 3% of the GB population).

- Protecting the most important foraging area for black guillemots on the east coast of the UK, with around 1,600 breeding black guillemots using this MPA.
- Protecting important cliff habitats where the protected features can nest, loaf, and that peregrines additionally use for hunting.
- 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.

2.3. Wider benefits

The protected features of the East Caithness Cliffs SPA and NC MPA 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 East Caithness Cliffs SPA and NC MPA 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 functions associated with the protected features are described in Annex 1 as part of the site's Conservation Objectives. This outlines how the protected features contribute to the functions described. The protected features, especially when taken within the context of the MPAs 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 these MPAs, and to the long-term health of the protected features.

East Caithness Cliffs SPA and NC MPA comprises a rich diversity of cliff habitats and marine habitats. The protected areas encompass cliffs and nearshore waters (out to around 2 km) between Wick and Helmsdale. 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. The cliffs support a wide diversity of vegetation types with variable maritime influence, including maritime grassland and maritime heath. The habitats support large concentrations of both breeding seabirds as well as breeding peregrine.

The rich and varied natural resources present within the protected areas give rise to a wide range of benefits to people. The seascapes and wildlife provide opportunities for tourism, recreation, and wildlife watching, all of which encourage local jobs and businesses. Fisheries and supporting businesses from local communities within and around the protected areas use and benefit from the area's fish and shellfish resources as well as the wildlife that is found here. Further benefits relating to health and well-being, food and nutrition also arise from the site's natural resources, resulting in a place where communities and visitors can spend time connecting with and enjoying nature. The MPAs provide the backdrop to local people's lives and livelihoods. The sites have tremendous cultural significance with the currents, harbours, fishing heritage and birds featuring prominently in literature, art and song throughout the ages.

The benefits that arise from the functions and natural resources of the MPAs are typically small in the context of the whole of Scotland, but some are of greater importance for these

MPAs 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.

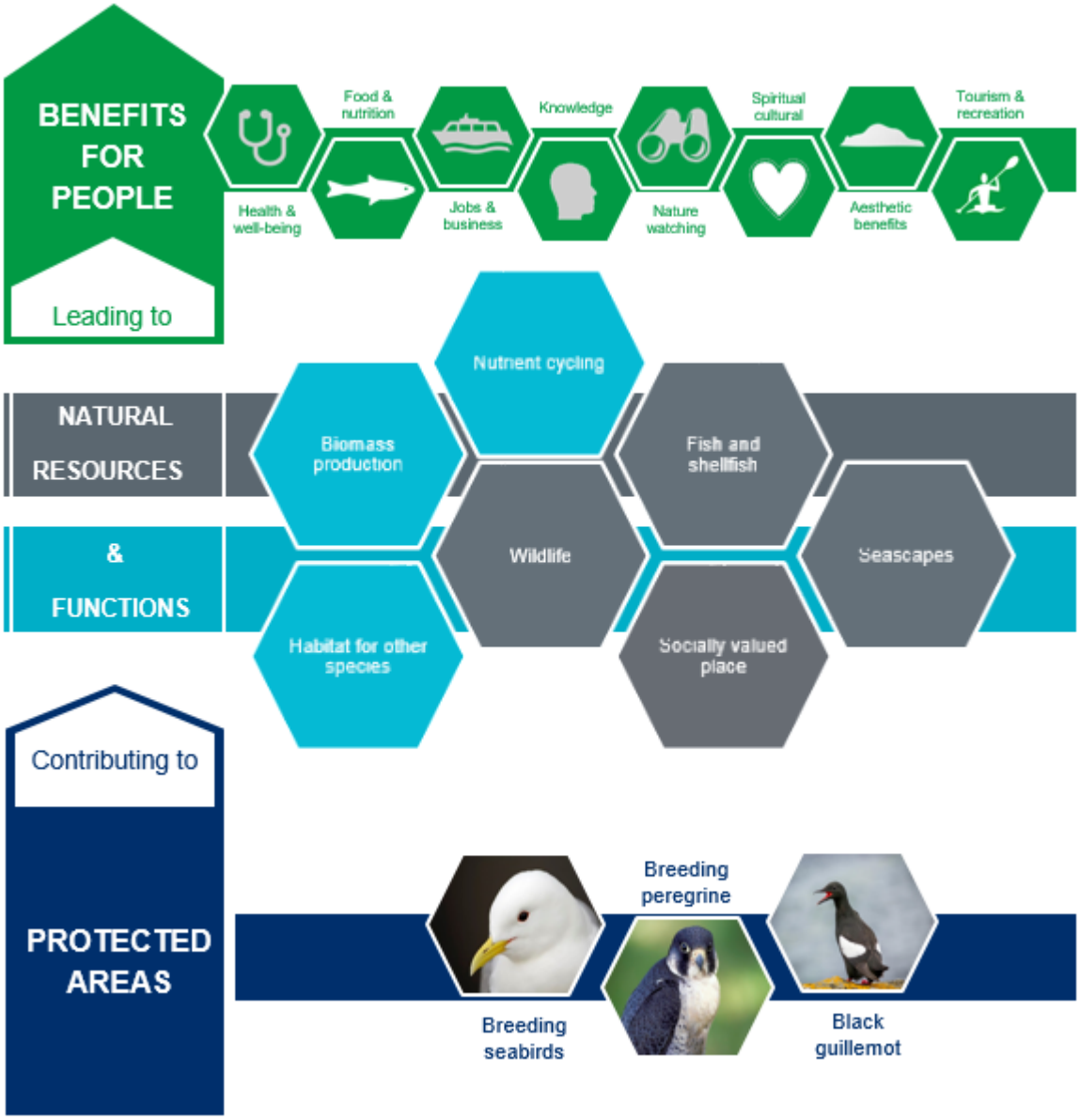

Figure 1. Benefits to people associated with protected features of the East Caithness Cliffs SPA and NC MPA.

2.4. Contribution to policy commitments

Managing the East Caithness Cliffs SPA and NC MPA to maintain and conserve the protected features in favourable condition, will ensure the continued provision of the benefits above as well as the 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 the East Caithness Cliffs SPA and the NC MPA 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, and the Conservation Objectives of the site.

Section 80 of the Marine Scotland Act gives NatureScot the remit to provide advice and guidance to public authorities as to the matters which are capable of damaging or otherwise affecting the protected features of Nature Conservation MPAs, how the Conservation Objectives of the site maybe furthered or their achievement hindered, and how the effects of activities on MPAs may be mitigated.

It is the role of the relevant and competent authorities[1] to ensure that the activities they regulate, permit or license do not risk the achievement of the Conservation Objectives of the East Caithness Cliffs SPA or NC MPA. The management advice in this document is provided to assist authorities in managing the activities outlined in Table 2, section 7, and undertaking Habitats Regulations Appraisals of plans and projects and carrying out their duties under Section 82 and 83 of the Marine (Scotland) Act 2010.

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 East Caithness Cliffs SPA has been selected to become part of the UK's SPA network, and the SPA and NC MPA jointly contribute 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.

[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.

The protected features of the East Caithness Cliffs SPA and NC MPA are protected within the sites 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 and NC MPA, 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 are 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. Current trends for peregrine are taken from the Scottish Raptor Monitoring Scheme (Challis *et al.* 2020).

Table 1. Protected features and status for the East Caithness Cliffs SPA and East Caithness Cliffs NC MPA.
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	Designation	Feature condition at site	Assessment year	Broader conservation status	
				UK[2]	European region[3]
Black-legged kittiwake (breeding)	SPA	Favourable declining	2015	Red	Vulnerable
Common guillemot (breeding)	SPA	Favourable maintained	2015	Amber	Least Concern
Cormorant (breeding)	SPA	Unfavourable declining	2015	Green	Least Concern
European shag (breeding)	SPA	Unfavourable no change	2015	Amber	Least Concern
Great black-backed gull (breeding)	SPA	Unfavourable no change	2015	Red	Least Concern
Herring gull (breeding)	SPA	Unfavourable no change	2015	Red	Least Concern
Northern fulmar (breeding)	SPA	Favourable maintained	2015	Amber	Vulnerable

[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

Protected Feature	Designation	Feature condition at site	Assessment year	Broader conservation status	
				UK[2]	European region[3]
Razorbill (breeding)	SPA	Favourable maintained	2015	Amber	Least Concern
Peregrine (breeding)	SPA	Favourable maintained	2014	Green	Least Concern
Black guillemot (breeding and non-breeding)	NC MPA	Unfavourable	2021	Green	Least Concern

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 the East Caithness Cliffs SPA and NC MPA should make to achieving Favourable Conservation Status for the protected features. They provide the framework for the setting of site conservation measures (management) and form the basis for the Habitats Regulations Appraisal of projects and plans and for authorities carrying out duties under Section 82 and 83 of the Marine (Scotland) Act 2010 for the East Caithness Cliffs SPA and NC MPA.

The Conservation Objectives for the East Caithness Cliffs SPA and NC MPA are provided, respectively in Annexes 1 and 2.

5.2 Relationship between feature condition and Conservation Objectives

The Conservation Objectives seek to *maintain* protected features of an SPA or seek to *conserve* protected feature(s) of a NC MPA 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 at the SPA and will seek to *recover* the protected feature at the NC MPA.

The following protected features are in favourable condition at East Caithness Cliffs SPA and NC MPA: guillemot, kittiwake, fulmar, razorbill, and peregrine. Therefore, the Conservation Objectives seek to *maintain* this condition for the SPA features.

The following protected features are in unfavourable condition at East Caithness Cliffs SPA: cormorant, shag, great black-backed gull, herring gull and black guillemot. Therefore, the Conservation Objectives seek to *restore* this condition for the SPA features and *recover* this condition for black guillemot.

Black guillemots have decreased by 45% at their breeding colony from 1600 birds (2014) to 876 birds (2015-2021 Seabirds Count). Reasons for such a decline is not fully understood. Black guillemots are susceptible to mammalian predation (Burnell *et al.* 2023), but this has

not been investigated at this MPA. Changes in prey availability is another possible reason for their decline.

Breeding cormorant are in unfavourable condition at the East Caithness Cliffs SPA due to a decline of around 77% of the population since from 230 pairs at designation (1996) to 53 pairs at the latest count (2015). Reasons for the decline of this species at East Caithness Cliffs SPA are unknown. In Caithness, the decline in breeding numbers has been associated with a high adult mortality, around 20% higher than anywhere else in Britain (Budworth *et al.* 2000). The mortality appears to occur during the non-breeding season where both licensed control along the salmon rivers in north-east Scotland, as well as persecution, occurs (Mitchell *et al.* 2004). Food supply in both summer and wintering populations of cormorants may also be having an impact on the East Caithness Cliffs SPA population.

Breeding European shag are in unfavourable condition at the East Caithness Cliffs SPA due to a decline of around 53% of the population since designation from 2300 pairs (1996) to 1098 pairs (2015 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 great black-backed gull are in unfavourable condition at the East Caithness Cliffs SPA due to a decline of around 66% from 800 pairs at designation (1996) to around 266 pairs (2015 count). The reasons for the decline are uncertain but are likely to be related to a reduction in opportunities to feed on fishery discards in the seas around the colony or reduction in other prey in foraging areas. Great black-backed gulls can also be vulnerable to poor weather conditions during the breeding season causing nest failures. These species are also subject to licensed control.

Breeding herring gull are in unfavourable condition at the East Caithness Cliffs SPA due to a decline of around 65% from 9400 pairs (1996 citation) to 3251 pairs (2015 count). The reasons for the decline are uncertain. The reasons for the decline are uncertain but are likely to be related to off-colony factors such as reduction in opportunities to feed on fishery discards in the seas around the colony or reduction in other prey in foraging areas. These species are also subject to licensed control.

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 East Caithness Cliffs SPA, peregrine falcon 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 protected features) and black guillemot.

There are currently no apparent management conflicts between the protected features within the East Caithness Cliffs SPA and NC MPA.

5.4 Overlapping Protected Areas

East Caithness Cliffs SPA and East Caithness NC MPA overlap with one another. In addition, the following protected areas overlap with, or are immediately adjacent to these sites are:

- East Caithness Cliffs Special Area of Conservation (SAC)
- Moray Firth SPA
- Castle of Old Wick to Craig Hammel Site of Special Scientific Interest (SSSI)
- Craig Hammel to Sgaps Geo SSSI
- Dunbeath to Sgaps Geo SSSI
- Berriedale Cliffs SSSI
- Ousdale Burn SSSI
- Helmsdale Coast SSSI
- Long Berry Coast SSSI

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 SAC and SPAs.

There are no apparent management conflicts between the protected features of the East Caithness Cliffs SPA and East Caithness NC MPA, and the protected features of the other overlapping areas.

Site information including the Conservation Objectives for the protected areas overlapping East Caithness Cliffs SPA and NC MPA 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 for the marine protected features will be made available on Marine Scotland's Feature Activity Sensitivity Tool (FeAST). 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 marine 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 Black guillemot (breeding and non-breeding)

Black guillemots are vulnerable to the introduction or spread of non-native and invasive species (e.g. mink, rats, cats) (Nordstrom *et al.* 2003; Mitchell *et al.* 2004). Black guillemots are also assessed as being vulnerable to risk of bycatch and entanglement in fishery nets (Zydelis *et al.* 2013; Okill, 2002), which can have potentially severe impacts in part of their range (Nettleship *et al.* 2018). Other pressures include barriers to movement and collision as a result of wave and tidal developments (Furness *et al.* 2012). Black guillemots are sensitive to oil spill pollution as they are exclusively coastal, resident all year round, and spend a lot of time feeding at sea and resting on the sea surface (Heubeck & Richardson 1980; Heubeck *et al* 1993; Heubeck, 2000). Visual disturbance as a result of vessel movements may negatively impact foraging behaviour for black guillemots (Ronconi & Clair, 2002). Some auk species are very sensitive to noise e.g. marbled murrelet (inshore species) (US Navy Report, 2011). Black guillemot is probably of a similar sensitivity, therefore inshore seismic proposals are likely to be an issue for this species, especially during the breeding season when birds forage close to breeding sites. Being a predominantly inshore feeding seabird, kelp forests form an important feeding habitat for black guillemots (Forrester, 2007). Any reduction in

prey-supporting habitat such as kelp forests, or in prey species they rely on could result in declines in numbers of black guillemots.

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 bycatch 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 Common guillemot (breeding) and razorbill (breeding)

Auks (including guillemots and razorbills) 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 are also susceptible to disease, including avian flu (APHA). These species may be displaced as a result of marine developments (Furness *et al.* 2013) and vessel activities associated with marine developments (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).*

6.4 Great cormorant (breeding)

Cormorants are susceptible to being bycatch (BirdLife International, 2022). Cormorants are also subject to licensed control, persecution, as well as being hunted in parts of their range. It is not fully understood how hunting and licensed control affects their populations however in north east Scotland high adult mortality (20% higher than other parts of Britain) has occurred and is associated with licensed control particularly in the non-breeding season (Budworth *et al.* 2000). Cormorants may have sensitivity to synthetic and non-synthetic compounds, and marine litter (e.g. Acampora, 2017; O'Hanlon *et al.* 2017). Cormorants may be vulnerable to collision from marine renewable developments, as some studies show they are attracted to windfarm developments as roosting sites (Vanerman *et al.* 2016). This species is sensitive to displacement for some activities (e.g. wave, tidal, seaweed harvesting, aggregate extraction, transport, encroachment of banks) but not all (e.g. wind and oil & gas) (MMO, 2018). They are also susceptible to diseases, such as avian influenza (Lee *et al.* 2017).

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 Great black-backed gull (breeding)

Gulls may be susceptible to disease (including avian flu (APHA)), persecution and licensed control (Mitchell *et al.* 2004). Gulls are vulnerable to collision with marine development above water (Furness *et al.* 2013). Other pressures include: accidental bycatch in fishing nets (Žydelis *et al.* 2013), oil pollution (Mendel *et al.* 2008) and organochlorine pollution (Camphuysen *et al.* 2010). Great black-backed gulls are also vulnerable to breeding failures due to invasive mammals such as mink (Mitchell *et al.* 2004). Gulls may also be displaced by marine development. Great black-backed gulls are sensitive to large-scale changes in prey availability (e.g. Bicknell *et al.* 2013).

6.7 Herring gull (breeding)

Gulls may be susceptible to disease (including avian flu (APHA)), persecution and licensed culls (Coulson, 2015). Gulls are vulnerable to collision with marine development above water (Furness *et al.* 2013). Other pressures include: accidental bycatch in fishing nets (Žydelis *et al.* 2013), oil pollution (Mendel *et al.* 2008) and organochlorine pollution (Camphuysen *et al.* 2010). Gulls may be displaced by marine development. Herring gulls are sensitive to large-scale changes in prey availability (e.g. Camphuysen, 2013; Bicknell *et al.* 2013).

6.8 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 susceptible to diseases such as avian flu. 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).

6.9 Peregrine (breeding)

Persecution has been a major threat to peregrines throughout their range (Birdlife International, 2022). Although persecution has decreased since peregrines gained legal protection, illegal persecution remains the biggest threat to this species (RSPB, 2014). Persecution in Scotland is particularly associated with grouse moor management (North East Scotland Raptor Study Group, 2015), but also with recreational breeding and racing of domestic pigeons (Wilson *et al.* 2014). There is also a concern about the illegal taking of eggs/young for foreign falconry trade, which at a regional scale can decrease productivity significantly (A. Stevenson, *pers comm*). This species is also vulnerable to pesticides and bioaccumulation of toxic chemicals, which in the past has caused eggshell breakages and mortality of adults (Falk *et al.* 2018, White *et al.* 2013). Peregrines exhibit behavioural sensitivity to human-induced disturbance and some activities may even cause nest abandonment (White *et al.* 2020). Peregrines are also considered vulnerable to the effects caused by wind farms (Strix, 2012) as well as collision or electrocution from electricity cables, or other man-made objects (White *et al.* 2020). Habitat change and any subsequent

reduction of prey base or availability can also have a subsequent effect on peregrine breeding success (RSPB, 2022) and peregrine numbers (Wilson *et al.* 2014).

7 Management

7.1 Conservation Measures

The following conservation measures are currently in place for the East Caithness Cliffs SPA and NC MPA:

- 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.

- Activities and developments subject to licensing that could affect the protected feature of the NC MPA also need to be assessed. Authorities need to determine whether if by carrying out their duties e.g. permitting an activity to take place, it would hinder the achievement of the Conservation Objectives of the MPA. This is referred to as an assessment under Section 82 or Section 83 of the Marine (Scotland) Act 2010.

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, available on SiteLink, must have prior consent from NatureScot.
- Overlapping existing fisheries measures occurs in the southern part of the SPA/ NC MPA: Fishing with any towed gear with a codend mesh size of less than 32 mm or static nets less than 30 mm mesh size shall be prohibited for the conservation of Juvenile Herring. (Seasonal March to October). EU 2019/1241 (as amended by UK SIs[4]).

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

[4] https://www.legislation.gov.uk/eur/2019/1241/annex/V

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 East Caithness Cliffs SPA and NC MPA 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**		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
Aircraft (specifically unmanned aerial vehicles (UAV))	**Reduce or limit pressures (disturbance)** associated with UAVs within the SPA/NC MPA through effective mitigation such as: • following the Good Practice Advice for drones and wildlife • seasonal restrictions to avoid sensitive time periods for those protected features most susceptible to disturbance and/or; • spatial restrictions.		
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: • following the Scottish Marine Wildlife Watching Code (SMWWC); • seasonal restrictions to avoid sensitive time periods for those protected features most susceptible to disturbance and/or; • 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.		**Reduce or limit pressures** (disturbance) associated with vessel movement from commercial and recreational activities through effective mitigation such as: • seasonal and/or spatial restrictions to avoid sensitive time periods for coastally breeding peregrines and/or • production of vessel management plans which may

Activities considered capable of affecting the protected features	Advice to support management		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
			include agreed routes and potential speed restrictions.
Infrastructure – Cables and powerlines*	**No additional management** for existing cables and powerlines. **Reduce or limit pressures** (disturbance, loss or damage to prey-supporting habitat) associated with new cable laying activities on land or in marine waters, within or adjacent to the SPA or NC MPA.		
Coastal development	**No additional management** for existing coastal protection and flood defences. **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. **Reduce or limit pressures** (disturbance) for new routes or amendments to existing routes within the context of cumulative effects of all boat activity.		
Discharges (industrial, agricultural, sewage)	**No additional management** for current levels of agricultural discharges.		
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. **Reduce or limit pressures** (removal of prey species and abrasion of prey-supporting habitat) associated with fishing that has the potential to damage seabed habitat (in particular, sandeel habitat) **should be considered.**		*Pressures unlikely to affect this feature.*
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.		*Pressures unlikely to affect this feature.*

Activities considered capable of affecting the protected features	Advice to support management		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
	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. **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) **is recommended.**		
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 (as identified from habitat and dive depth preferences) **is recommended**.	**Remove or avoid pressures** (entanglement) associated with the use of all static nets. Spatial exclusion of static nets in areas identified as being important for shag and cormorant (as identified from habitat and dive depth preferences) **is recommended**.	*Pressures unlikely to affect this feature.*
Fishing – hand gathering or diver collection of mussels and oysters	**Reduce or limit pressures** (disturbance) associated with hand-harvesting of mussels and oysters **should be considered.**		*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 or NC MPA, this position should be retained. Pelagic fishing for herring/sprat may occur within or around the SPA or NC MPA. 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 availability of prey species i.e. it should be considered as part of a broader ecosystem-based approach to management of this fishery.		*Pressures unlikely to affect this feature.*

Activities considered capable of affecting the protected features	Advice to support management		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
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.*
Fishing - recreational	**No additional management** for existing recreational fishing providing the Scottish Marine Wildlife Watching Code (SMWWC), the Scottish Outdoor Access Code, and the Countryside Code are followed by recreational users.	**Reduce or limit pressures** (mortality) associated with licensed control for cormorant– *existing management in place*.	*Pressures unlikely to affect this feature.*
Ports and harbours (inc. development and ship-to-ship transfer)	**No additional management** for established activities at ports and harbours within the SPA or NC MPA. **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 or NC MPA. Appropriate mitigation may include: • spatial limitations to avoid damaging supporting habitat within foraging dive range of the protected features and/or; • seasonal restrictions during construction to avoid periods when birds are present. **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.		*Pressures unlikely to affect this feature.*

Activities considered capable of affecting the protected features	Advice to support management		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
Renewable energy (inc. onshore and offshore wind)	**No additional management** for operational, for consented, but not yet constructed, and for in construction offshore wind developments. This is providing mitigation measures as agreed at the Moray Firth Regional Advisory Group (MFRAG) and on a project specific basis are deployed. There are new marine renewable development proposals within connectivity to the East Caithness Cliffs SPA. Mitigation should focus on reducing or limiting pressures (disturbance, displacement, collision) on the protected features. *For herring gull and great black-backed gull* For any new onshore renewable development proposals within connectivity to the East Caithness Cliffs SPA, mitigation should focus on reducing or limiting pressures (disturbance, displacement, collision) on the gull protected features. *For black guillemot* **Remove or avoid pressures** (disturbance, displacement, collision, loss or damage to prey) for new marine renewable development proposals in areas identified as being important for black guillemots within the MPA.		For any new onshore renewable development proposals within connectivity to the East Caithness Cliffs SPA, mitigation should focus on reducing or limiting pressures (disturbance, displacement, collision) on peregrine.
Tourism & recreation (inc. walking, guided walks, climbing, angling, leisure boat users, jet skiing, kayaking)	**No additional management** for existing recreational activities (includes angling, boating, 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. **No additional management** for current levels of land-based tourism activities (walking, climbing), providing Scottish Outdoor Access Code is followed.		**No additional management** requirements for land-based tourism activities (walking, climbing), providing the Scottish Outdoor Access Code is followed and any climbing restrictions are checked via the Mountaineering Scotland page.

Activities considered capable of affecting the protected features	Advice to support management		
	Kittiwake, black guillemot, guillemot, razorbill, herring gull, great black-backed gull, fulmar.	**Shag, cormorant**	**Peregrine**
	Reduce or limit pressures (disturbance) of protected features from jet-skiing. **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 or NC MPA. There would be potential for some zonation of measures across the site given that some protected features exhibit behavioural sensitivity to disturbance.		**Reduce or limit pressures** (disturbance) on peregrines if in the future there is evidence of impacts at particular locations and/or if there is major increase in intensity of land-based or water-based tourism within the SPA.
Scientific survey/research	**No additional management** for current level of scientific research at the SPA provided appropriate mitigations to minimise disturbance in the breeding season is in place.		
Seaweed harvesting	**Reduce or limit pressures** (disturbance) associated with new seaweed harvesting developments. **Remove or avoid pressures** (disturbance, removal of prey supporting habitat) associated with mechanical harvesting of seaweed (in particular, of kelp).		*Pressures unlikely to affect this feature.*
Wildlife tour operators*	**No additional management** for existing wildlife tours providing the Scottish Marine Wildlife Watching Code is followed by Wildlife tour operators. The Scottish Marine Wildlife Watching Code (SMWWC) should be followed by water-borne recreational users and Scottish Outdoor Access Code is followed by land users. **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 or NC MPA. There would be potential for some zonation of measures across the site given that some protected features exhibit behavioural sensitivity to disturbance.		**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.

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.
Farming and livestock	There may be pressures associated with farming and livestock (disturbance, change of habitat type and the availability of prey species for peregrine). However, at this time we consider this poses a low risk to conservation objectives.
Fishing – static gear – Creels (including lobster, crabs and *Nephrops*)	Fishing using creels takes place within 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. Pressures associated with the vessel traffic from this pressure is covered under Table 2.
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 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 and NC MPA.
- 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 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.
- 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.
- Better understanding of temporal foraging strategies of fulmar and whether there are any differences between daytime and night-time attraction of these species to fishing.
- Research is required on understanding the connectivity between the SPA and inland sites used by gull species.
- Research is required on understanding the connectivity between the SPA and inland sites used by gull species and whether gulls from this SPA are at risk of collision with wind turbines.

- Research is required on understanding the potential population level impact of licensed control on cormorants, herring gulls and great black-backed gulls which use this SPA.
- 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 is required on understanding the connectivity between the SPA and inland sites and rivers used by cormorants.
- Better annual monitoring of peregrine population at the SPA.
- Research on factors affecting the productivity of peregrines at the SPA, including whether pollutant accumulation occurs (for example, could be studied by analysing addled eggs).
- Updated count required for black guillemots at the site, as well as updated data on their distribution within the site.

Annex 1. East Caithness Cliffs SPA Conservation Objectives

The box below provides the high-level Conservation Objective statements for the East Caithness Cliffs 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 3 '*Factors determining the potential of features to recover'*.

A definition of the terms used is in the Glossary (Annex 4). The * denotes a qualifying feature that is an assemblage feature only.

East Caithness Cliffs SPA
Qualifying features: • Common guillemot (*Uria aalge*) • Cormorant (*Phalacrocorax carbo)* • European shag (*Gulosus aristotelis*) • Black-legged kittiwake (*Rissa tridactyla*) • Herring gull (*Larus argentatus*) • Great black-backed gull (*Larus marinus*)* • Northern fulmar (*Fulmarus glacialis*)* • Razorbill (*Alca torda*) • Peregrine (*Falco peregrinus)*
The East Caithness Cliffs SPA also supports: • Breeding seabird assemblage (includes all seabird features)
1. To ensure that the qualifying features of the East Caithness Cliffs SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status. 2. To ensure that the integrity of the East Caithness Cliffs SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature: 2a The populations of the qualifying features are viable components of the East Caithness Cliffs SPA. 2b. The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species. 2c. The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the East Caithness Cliffs SPA.

1. To ensure that the qualifying features of the East Caithness Cliffs 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. The conservation status will be taken as 'favourable' when: • 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; • the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; • there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis; 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 East Caithness Cliffs 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. 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 East Caithness Cliffs SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:

This objective recognises that shag, herring gull, great black-backed gull and cormorant are in unfavourable condition at the East Caithness Cliffs SPA and consequently site integrity is compromised.

For the East Caithness Cliffs 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 shag, herring gull, great black-backed gull and cormorant 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 East Caithness Cliffs 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 East Caithness Cliffs 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. In coastal breeding sites, increased flooding associated with storm tides may also cause nest site failures in breeding seabirds (Mendel *et al.* 2008).
- ***Auks (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, 2022). 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).
- ***Cormorant:*** Temperature increases have been attributed to cormorants expanding their range into previously colder climates. Cormorants are susceptible to die offs in particularly cold winters (Russell *et al.* 2015; Marion & Bergerot, 2018).
- ***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).
- ***Great-black-backed gull:*** predicted to decrease in number of breeding pairs across GB and Ireland as a result of climate change, with temperature, precipitation and potential energy anomaly all variables playing a role in predicted population changes (Davies *et al.* 2021).
- ***Herring gull:*** this species is indirectly influenced by climate variation (for example stratification, sea surface temperature, the North Atlantic Oscillation), as mediated through changes in their food supply (Johnston *et al.* 2021), which in turn can affect their breeding success. Low-lying gull nests can be susceptible to flooding either through sea level rise or increase in storminess (Johnston *et al.* 2021). Overall, herring gulls are predicted to decrease as a result of climate change (Davies *et al.* 2021).
- ***Peregrine:*** Warming sea temperatures and the subsequent effects on seabirds, may indirectly effect those peregrines that rely on seabirds as a food source (Birdlife International, 2022). Increased heavy rainfall can also cause chicks to die and thus breeding productivity may decrease for peregrines (e.g. Carlzon *et al.* 2018).

2a. The populations of the qualifying features are viable components of the East Caithness Cliffs 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 East Caithness Cliffs SPA make 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 East Caithness Cliffs 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. In the East Caithness Cliffs SPA, this means that all breeding qualifying features should be able to breed successfully and should subsequently be in good enough body condition to be able to survive the winter.

For the SPA qualifying features, the viability of the species within the East Caithness Cliffs SPA is intrinsically linked to their ability to access and use foraging areas outwith the site, in addition to the ability of the site to support breeding adult survival and chick-rearing.

For the East Caithness Cliffs SPA 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 or restored as appropriate, 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); predation, flooding events, disease, 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, modification or intertidal or coastal habitat). 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**
Black-legged kittiwake	Maintain the breeding population of kittiwake at a stable or increasing trend relative to the site reference population. ***and*** Ensure kittiwake are not at significant risk from injury or mortality. ***and*** Ensure kittiwakes can move safely between the site and important areas of functionally linked sea and freshwater outwith the site.	The site reference population for breeding kittiwakes at the East Caithness Cliffs SPA is 32, 500 pairs (1996 count). The latest count data available for kittiwakes showed a decrease of 24.7% to around 24,460 pairs (2015). 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). 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. Plans or projects should also ensure that kittiwakes are not at significant risk from injury or mortality either within or outwith the SPA. The long-term maintenance of kittiwakes at the East Caithness Cliffs SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA. Kittiwakes also require access to freshwater for bathing. Kittiwakes have been recorded bathing where rivers flow into the sea, for example on rivers within (e.g. Dunbeath, Berriedale, and Latheronwheel) and outwith the SPA (e.g. Rivers Helmsdale and Wick). They also will bathe in harbours, for example at Lybster. 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.
Common guillemot	Maintain the breeding population of guillemot at a stable or increasing trend relative to the	The site reference population for breeding guillemots at the East Caithness Cliffs SPA is 106,700 individuals (1996 count). The latest count data available for the East Caithness Cliffs SPA shows this number has increased to around 149,000 individuals (2015 count). Guillemot populations in the UK decreased by 8% since Seabird 2000 (1998-2002) and 31% in Scotland (Burnell *et al.,* 2023).

	site reference population. ***and*** Ensure guillemots are not at significant risk from injury or mortality. ***and*** Ensure guillemots can move safely between the site and important areas of functionally linked sea outwith the site.	The long-term maintenance of guillemot at the East Caithness Cliffs 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.
Cormorant	Ensure the breeding population of cormorant have the ability to recover to the site reference population. ***and*** Ensure cormorants are not at significant risk from injury or mortality. ***and***	The site reference population for breeding cormorants at the East Caithness Cliffs SPA is 230 pairs (1996 citation), representing 3% of the GB wintering population. Cormorants have decreased at the SPA to around 70 pairs at the latest count (2019) (Sellers, 2020). Cormorants have decreased by approximately 5% since Seabird 2000 (1998 – 2002) which signals the end of the increasing trend documented since Operation Seafarer (1969-70). In Scotland, great cormorant are estimated to have decreased by 6% since Seabird 2000 (Burnell *et al.,* 2023), and particular declines in the North Highland have been noted (Humphreys *et al.* 2013). Reasons for the decline of this species at East Caithness Cliffs SPA are not known and requires further investigation. In Caithness, the decline in breeding numbers has been associated with a high adult mortality, around 20% higher than anywhere else in Britain (Budworth *et al.* 2000). The mortality appears to occur during the non-breeding season where both licensed control along the salmon rivers in north east Scotland, as well as persecution occurs (Burnell *et al.,* 2023). This species is subject to annual licensed control at freshwater bodies outwith the SPA. Food supply in both summer and wintering populations of cormorants may also be having an impact on the East Caithness Cliffs SPA population.

	Ensure cormorant can move safely between the site and important areas of functionally linked land and freshwater bodies outwith the site.	The long-term recovery of cormorants at the East Caithness Cliffs SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked land and freshwater environments outwith the SPA during both the breeding and non-breeding seasons. 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.
European shag	Ensure the breeding population of shags have the ability to recover to the site reference population. ***and*** Ensure shags are not at significant risk from injury or mortality. ***and*** Ensure shags can move safely between the site and important areas of functionally linked sea outwith the sites.	The site reference population for breeding shags at the East Caithness Cliffs SPA is 2300 pairs (1996 citation), representing 6% of the GB population. This species has decreased at the site by around 53% to around 1100 pairs (2015 count). 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% (Burnell *et al.,* 2023). The reasons for the decline of shag 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 factors such as reduction in prey in foraging areas. Research is required to fully understand the reasons behind the decline and whether there is anything that can be done to reverse it. The long-term recovery of shags at the East Caithness Cliffs SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea outwith the SPA (which includes access to the Moray Firth 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.
Herring gull	Ensure the breeding population of herring gull have the ability to recover to the site reference population.	The site reference population for breeding herring gulls at the East Caithness Cliffs SPA is 9,400 pairs (1996 citation), representing 6% of the GB population. The latest complete site assessment available for the East Caithness Cliffs SPA showed this number decreased by 65% to around 3251 individuals (2015 count). Herring gulls have experienced a 44% decline in their breeding populations within the UK since Seabird 2000 (1998-2002). In Scotland, Herring gull have decreased by 44%

	and Ensure herring gulls are not at significant risk from injury or mortality. ***and*** Ensure herring gull can move safely between the site and important areas of functionally linked land and sea outwith the site.	(Burnell *et al.,* 2023). Monitoring in 2023 indicated a further decline of 24% in Scotland due to avian flu (Tremlett *et al.,* 2024). The reasons for the long-term decline of herring gull at this SPA are uncertain. Off-colony factors such as reduction in prey in foraging areas and reduction in opportunities to feed on fishery discards may be contributing to the decline. Research is required to fully understand the reasons behind the decline and whether there is anything that can be done to reverse it. The long-term recovery of herring gulls the East Caithness Cliffs SPA is also intrinsically linked to their ability to access and use habitats in areas of functionally linked sea and land outwith the SPA. This may include marine foraging areas as well as terrestrial environments. In the terrestrial environment herring gulls may be foraging in agricultural/pastoral fields, along the coastlines in intertidal habitats, in freshwater habitats, at landfills, and in urbanised/more built-up areas. It is not known where the herring gulls at the East Caithness Cliffs SPA forage, but it is likely to be a mixture of all the marine, terrestrial and coastal habitats. 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 black-backed gull	Ensure the breeding population of great black-backed gull have the ability to recover to the site reference population. ***and*** Ensure great black-backed gull are not at significant risk from injury or mortality. ***and***	The site reference population for breeding great black-backed gulls at the East Caithness Cliffs SPA is 800 pairs (1996 citation), representing 4% of the GB population. The latest assessment of site condition noted a decrease of around 66% to approximately 266 pairs (2015 count). Great black-backed gulls in the UK have decreased by around 43% since Seabird 2000 (1998-2002). The trend in Scotland is even more pronounced with a decrease of 63% (Burnell *et al.,* 2023). Monitoring in 2023 indicated a further decline of 19% in Scotland due to avian flu (Tremlett *et al.,* 2024). The reasons for the long-term decline of this species at the East Caithness Cliffs SPA are uncertain but are likely to be related to a reduction in prey and reduction in opportunities to feed on fishery discards. Great black-backed gulls can also be vulnerable to poor weather conditions during the breeding season causing nest failures. This species is also subject to licensed control, although population-level effects of this are poorly understood. Research is required to fully understand the reasons behind the decline and whether there is anything that can be done to reverse it. The long-term recovery of great black-backed gulls in the East Caithness Cliffs SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked sea and land outwith

	Ensure great black-backed gull can move safely between the site and important areas of functionally linked land and sea outwith the site.	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 fulmar	Maintain the breeding population of fulmars at a stable or increasing trend relative to the site reference population. ***and*** Ensure fulmars are not at significant risk from injury or mortality. ***and*** Ensure fulmars can move safely between the site and important areas of functionally linked sea outwith the site.	The site reference population for breeding fulmars at the East Caithness Cliffs SPA is 15,000 pairs (1996 citation), representing 3% of the GB population. The latest count data showed this number has decreased by around 8% to approximately 14,000 pairs (2015 count). 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). The long-term maintenance of fulmars at the East Caithness Cliffs 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	Maintain the breeding population of razorbills at a	The site reference population for breeding razorbills at the East Caithness Cliffs SPA is 15,800 individuals (1996 citation), representing 11% of the GB population. The latest count data showed this number has increased to around 30,000 individuals (2015 count). UK razorbill populations have

	stable or increasing trend relative to the site reference population. ***and*** Ensure razorbills are not at significant risk from injury or mortality. ***and*** Ensure razorbills can move safely between the site and important areas of functionally linked sea outwith the site.	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). The long-term maintenance of razorbills at the East Caithness Cliffs 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.
Peregrine	Maintain the breeding population of peregrine at a stable or increasing trend relative to the site reference population. ***and*** Ensure peregrines are not at significant risk from injury or mortality.	The site reference population for peregrines at the East Caithness Cliffs SPA is six pairs (1996 citation), representing around 0.5% of the GB population. The last count at this SPA (in 2019) found two vacant territories, but the site was not fully covered. Therefore, it is not known if the decline is a real decline. A more up to date survey of the site is required to ascertain the number of current territories. Overall, the UK population of peregrines have remained stable between the 2002 and 2014 surveys. However, there are drastic differences in trends between the UK countries. Scotland has seen an approximate 11% decrease in peregrine numbers between 2002-2014, whereas England has seen a 34% increase in numbers (BTO, 2014). The long-term maintenance of peregrines in East Caithness Cliffs SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked land outwith the SPA, for example open farmland and moorland/bog. 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.

	and Ensure peregrine can move safely between the site and important areas of functionally linked land 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 East Caithness Cliffs 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 in the subsequent breeding season (related to poor winter condition of adult birds), 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 East Caithness Cliffs 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 all qualifying features: 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/sites 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**
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. ***and***	Kittiwakes are migratory species with the vast majority of adults from North Atlantic colonies such as the East Caithness Cliffs SPA appearing 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 the East Caithness Cliffs 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. In the East Caithness Cliffs SPA kittiwakes will nest on steep, coastal cliffs and offshore stacks. They are particularly abundant in the Berriedale Cliffs SSSI and Craig Hammel to Scaps Geo SSSI

	Avoid significant disturbance to kittiwakes and ensure individuals can move safely between these areas within the site.	stretches of the coastline. Kittiwakes also require access to areas of freshwater where rivers and streams flow into the sea within the SPA which they require for bathing. Within the SPA they will use water at rivers Dunbeath, Berriedale and Latheronwheel, as well as at Lybster harbour. For roosting, they may use manmade walls and sandy shores. Kittiwakes at the East Caithness Cliffs SPA will 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. 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, such as Loth and Brora beaches, to moult in large flocks of individuals.
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. ***and*** Avoid significant disturbance to guillemots and ensure individuals can move safely between these areas within the site.	Guillemots are present in the East Caithness Cliffs SPA throughout the year. Guillemots' breeding season is from April until mid-August. From the beginning of August to mid-October they will remain on the waters by the East Caithness Cliffs SPA, where adults will undergo a flightless moult period. Guillemots will attend their breeding sites surrounding the East Caithness Cliffs SPA frequently during the non-breeding period, particularly from February onwards. Guillemots will nest on bare cliff ledges and flat boulders at the East Caithness Cliffs SPA in dense colonies. They are particularly abundant in the Berriedale Cliffs SSSI and Craig Hammel to Scaps Geo SSSI stretches of the coastline. They use areas close to the coast as well as offshore waters in which to forage, rest, and carry out other maintenance activities. In the breeding period, the foraging range of common 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). 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).
Cormorant	Ensure cormorant continue to have access to and can utilise all optimal habitats suitable for all relevant aspects	Cormorants are present at the East Caithness Cliffs SPA throughout the year. Their breeding period is from mid-February to mid-September. Cormorants build large nests on rocky promontories or cliffs along the East Caithness Cliffs SPA. Areas used include Ord Point, Traigh Bhuidhem and the Stacks of Occumster (Sellers, 2020).

	of their life cycle associated with the site. ***and*** Avoid significant disturbance to cormorant and ensure individuals can move safely between these areas within the site.	Cormorants will use the coastal environment within the SPA including nearshore waters and sheltered bays, tending to avoid deep water, rarely diving below 10m, though they have been recorded diving as deeply at 35m (Gremillet *et al.* 2003). Several studies have shown that this species may forage up to 20-25 km from its breeding colonies, though trips of up to a 35 km radius have been recorded (Gremillet, 1997).
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. ***and*** 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 East Caithness Cliffs SPA throughout the year. Their main breeding period is from March to September. Within the East Caithness Cliffs SPA the majority of shags nest among boulders and caves round the coast, particularly within the Berriedale Cliffs SSSI and the Craig Hammel to Scaps Geo SSSI. They will use nearshore and further offshore waters in which to forage. Shags forage by day, tending 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). 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). Shags also use seaweed as a foraging habitat (Goodship & Furness, 2018).
Herring gull	Ensure herring gulls continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.	Herring gulls will be present at the East Caithness Cliffs 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. Herring gulls nest on ledges near the top of the cliffs, and on top of stacks and promontories throughout East Caithness Cliffs SPA. As with other gull species, herring gulls nest on flat ground with a shallow nest made from grass, moss and sometimes seaweed. Herring gulls use areas close

	and Avoid significant disturbance to herring gulls and ensure individuals can move safely between these areas within the site.	to the coast as well as offshore waters in which to forage, rest, and carry out other maintenance activities. Herring gulls feeding in the marine environment are largely surface feeders, scavengers, and predators although they can dive up to 2m for prey items. They may also kleptoparasitise other seabirds for fish such as sandeel. They can dive up to 2m for prey items. In the breeding period, herring gulls have a mean maximum foraging range of 58.8±26.8km (Woodward *et al.* 2019), though in the non-breeding season the foraging range may be much larger than this.
Great black-backed gull	Ensure great black-backed gulls continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site. ***and*** Avoid significant disturbance to great black-backed gulls and ensure individuals can move safely between these areas within the site.	Great black-backed gulls will be present at the East Caithness Cliffs 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. Great black-backed gulls at the East Caithness Cliffs SPA nest on ledges near the top of the cliffs, and on top of stacks and promontories throughout East Caithness Cliffs SPA. As with other gull species, great black-backed gulls nest on flat ground, with a shallow nest made from grass, moss and sometimes seaweed. Great black-backed gulls are predators and opportunistic scavengers, which will also kleptoparasitise other seabirds for fish such as sandeel. In the breeding period, great black-backed gulls have a mean maximum foraging range of 73km (Woodward *et al.* 2019). As well as using the SPA for breeding and foraging, the great black-backed gulls will also use the SPA for roosting. It is not currently known if they have preferred roost locations within the SPA.
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.	Fulmars have their main breeding period at the East Caithness Cliffs 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 the East Caithness Cliffs SPA at some stage throughout the yearly cycle. Fulmars at the East Caithness Cliffs SPA will nest on grassy ledges near the tops of cliffs, or on steep ground overlooking the sea, with a small scrapping and pieces of vegetation on the ground. They are found throughout the SPA. They use areas close to the coast as well as offshore waters in

	and Avoid significant disturbance to fulmar and ensure individuals can move safely between these areas within the site.	which to forage, rest, and carry out other maintenance activities. Fulmars have a large foraging range of 542.3 ±657.9km during the breeding period, though distances of 2890km have been recorded (Woodward *et al.* 2019). Fulmars forage both during the day and at night. They are surface feeding predators and scavengers, able to dive usually less than 5m (Edwards *et al.* 2013).
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. ***and*** Avoid significant disturbance to razorbill and ensure individuals can move safely between these areas within the site.	Razorbills will be present during their breeding period at the East Caithness Cliffs 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 East Caithness Cliffs SPA winter. Razorbills at the East Caithness Cliffs 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. The largest colonies within the SPA are found at Castle of Old Wick to Craig Hammel SSSI, Craig Hammel to Scaps Geo SSSI and Berriedale Cliffs SSSI. 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).
Peregrine	Ensure peregrines continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site. ***and***	Peregrines are resident throughout the year at the East Caithness Cliffs SPA, with their breeding season being from March to mid-July. Nesting at the SPA will occur on cliffs or on small ledges within rock faces, with eggs being laid in a scrape or depression in a rock, with no nest being built. Each territory may have more than one alternative nest site. Peregrines are predominantly predators, particularly of other birds. Their diet includes a wide range of mostly medium-sized birds, commonly taking various seabirds and rock dove/feral pigeon, but also may take waders and other shorebirds. Foraging is likely to take place throughout the whole SPA and in nearby areas. Peregrines have a foraging range of up to 18km with a territory size of 2 km.

	Avoid significant disturbance to peregrine and ensure individuals can move safely between these areas within the site.	During the breeding season the alert disturbance (the distance at which alert behaviour is displayed) is estimated to be up to 750 m whilst the flight initiation distance (the distance at which escapee behaviour is initiated) is estimated to be up to 500 m (Goodship & Furness, 2019, NatureScot, 2022). Therefore, for peregrines, a 500-750m buffer is used for terrestrial disturbance distances (NatureScot, 2022).

2c. The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored at the East Caithness Cliffs SPA.

This objective seeks to maintain or restore, as appropriate, 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 breeding shag, herring gull, great black-backed gull and cormorant using the East Caithness Cliffs SPA are in unfavourable condition and that this may, in part, be due to factors at the SPA.

The qualifying features require suitable habitat for breeding, 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. The supply of food resources is supported by environmental processes.

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.

In the terrestrial environment, within the SPA supporting habitats refer to the characteristics of the cliffs and surrounding vegetation, and the shoreline relevant to their use by the qualifying features. Supporting processes relates to wider processes such as factors affecting coastal erosion, and factors affecting vegetation formation, all of which will influence the habitat types and prey distribution available for the qualifying features.

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 East Caithness Cliffs SPA.

The overall water body condition status relevant to the East Caithness Cliffs SPA was assessed as "Good"[7] (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 East Caithness Cliffs SPA.		
Feature	**Site-specific advice**	**Site-specific information**
Black-legged kittiwake	Maintain the extent and distribution of the supporting habitats for kittiwakes within the site. ***and*** Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. ***and*** 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.	Kittiwakes at the East Caithness Cliffs 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 and sandy shores. Kittiwakes at this SPA use freshwater river outflows into the sea. Kittiwakes at the East Caithness Cliffs SPA will 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. Kittiwakes may also use sandy beaches to moult in flocks of individuals. Kittiwakes are omnivorous, with a diet consisting predominantly of shoaling marine fish and invertebrates (e.g. squid and shrimps) obtained just below or under (up to 4m) the sea surface. During the breeding season they may also feed on intertidal molluscs, crustaceans (e.g. crayfish), earthworms and plant matter (del Hoyo *et al.* 1996) and may use seaweed for foraging due to the association of seaweed with benthic infauna (Goodship & Furness, 2019). Sandeel are a particularly important prey item, as well as sprat, rockling and gadoids. When fishing, they will often feed in small flocks. Information is lacking on the supporting habitats for kittiwakes at the East Caithness Cliffs SPA, but may relate to the availability of cliff nesting habitat. In the marine environment the supporting processes may relate to water quality (nutrients and turbidity) and water flow.

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

Common guillemot	Maintain the extent and distribution of the supporting habitats for guillemot within the site. ***and*** Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. ***and*** 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 East Caithness Cliffs 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 and rest. Guillemots forage both at the seabed (demersal) and within the water column (pelagic) up to 200m, primarily during daylight hours (Wakefield *et al.* 2017). 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. The key supporting habitats for guillemots at the East Caithness Cliffs 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).
Cormorant	Maintain or enhance the extent and distribution of supporting habitats for cormorant within the site. ***and*** Ensure the variety and abundance of food resources and the condition of supporting	Cormorants at the East Caithness Cliffs SPA will use the SPA habitats for breeding, roosting and foraging. Their nests are constructed from twigs, sticks, and seaweed. A cormorant colony is often characterised by being whitewashed with guano (Mitchell *et al.* 2004). Cormorants are predominantly piscivores, feeding on species such as sculpins, capelin, gadids, flatfish, and will also eat crustaceans, amphibians and molluscs (BirdLife International, 2022). When feeding within marine waters cormorants tend to feed on bottom-dwelling fish, though they may take shoaling fish in deeper waters (del Hoyo *et al.* 1992). Cormorants rarely dive below 10m, though they have been recorded diving as deeply at 35m (BirdLife International, 2022).

	habitats and associated processes have the ability to recover. ***and*** 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.	Cormorants have been shown to select areas with sandy substrates, as these are the prey supporting habitats for flatfish, as well as rocky substrates, for prey such as wrasse, sea scorpians and small gadoids (BirdLife International, 2022). Information is lacking on the key supporting habitats and processes for cormorants at the East Caithness Cliffs SPA, but may relate to the availability of suitable nesting habitat, water quality (nutrients and turbidity) and water flow.
European shag	Maintain or enhance the extent and distribution of the supporting habitats for shags within the site. ***and*** Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover. ***and*** Existing water quality should be maintained and any increase in eutrophication or water	Shags require suitable habitat for breeding, foraging, loafing, bathing, and other maintenance activities within the East Caithness Cliffs SPA. Shags prefer rocky coasts with deep, clear water and forage over sandy and rocky seabeds (del Hoyo *et al.* 1992). In the East Caithness Cliffs 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). 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).

	turbidity, where this could reduce supporting habitats and/or prey, should be avoided.	The key supporting processes for shags at the East Caithness Cliffs SPA may relate to the availability of suitable nesting habitat, as well as 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). Shags tend to avoid muddy areas for foraging, suggesting that reduced visibility in turbid waters may hamper their foraging. 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. At East Caithness Cliffs SPA, sheltered areas are more common when the prevailing wind is westerly, compared to an easterly wind, the latter of which leads to a lack of shelter for shags at this SPA.
Herring gull	Maintain or enhance the extent and distribution of the supporting habitats for herring gulls within the site. ***and*** Ensure the variety and abundance of food resources and the condition of supporting habitats and associated processes have the ability to recover. ***and*** 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.	Herring gulls require suitable habitat for breeding, roosting, loafing, foraging, and maintenance activities within the East Caithness Cliffs SPA. Their nest will usually be shallow and made from grass, moss and sometimes seaweed. Herring gulls are opportunistic scavengers and predators. Herring gulls feed in the marine, coastal and terrestrial environments. Herring gulls feeding in the marine environment within this SPA will be largely feeding on the surface and scavenging, diving up to 2m for prey items. When foraging in the marine and coastal environments their prey will include fish, crabs, molluscs, starfish, marine worms and may also scavenge from fishing boats (del Hoyo *et al.* 1996). Herring gulls may also forage within infralittoral reef kelp forests to feed on benthic infauna (Kelly, 2005). Information is lacking on the supporting habitats and processes for herring gulls at the East Caithness Cliffs SPA, but may relate to the availability of suitable nesting habitat as well as any processes that would affect their prey.

Fulmar	Maintain the extent and distribution of the supporting habitats for fulmars within the site. ***and*** Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. ***and*** 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.	Fulmars require suitable habitat for breeding, foraging, loafing, and other maintenance activities within the East Caithness Cliffs SPA. Fulmars at the East Caithness Cliffs SPA will use grassy ledges by cliffs for nesting habitat. Fulmars will forage in the offshore waters, often over shelf break waters, feeding within 5m of the surface. Fulmars forage both during the day and at night. They have a wide ranging prey base, with their main prey items being: small fish, zooplankton (especially copepods and amphipods), shrimp, squid, jellyfish, crustaceans, offal from fisheries, carrion (BirdLife International, 2022). The key supporting habitats for fulmars at the East Caithness Cliffs SPA may relate to the availability of suitable grass and ledges for nesting. In the marine environment the presence of shelf breaks are often important, where there are areas of high biological productivity due to the oceanic thermal fronts (Edwards *et al.* 2013).
Great black-backed gull	Maintain or enhance the extent and distribution of the supporting habitats for great black-backed gull within the site. ***and*** Ensure the variety and abundance of food resources and the	Great black-backed gulls require suitable habitat for nesting, roosting, loafing, foraging, and maintenance activities within this SPA. Their nest will usually be shallow and made from grass, moss and sometimes seaweed. Great black-backed gulls are predators and opportunistic scavengers, which will also kleptoparasitise other seabirds for fish such as sandeel. They will also predate other seabirds (both adults, young and eggs). Prey is normally eaten on the water or on low-tide rocks and pulled apart (Cramp & Simmons, 2004). Seabird prey may be killed in the air, on the water, or as they emerge from their burrows. Other food sources may include fish (such as herring, whiting, sandeels, and capelin), mammals, marine invertebrates (e.g. molluscs), carrion and human refuse (Birdlife

	condition of supporting habitats and associated processes have the ability to recover. ***and*** 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.	International, 2022). Chicks are fed similar items than those taken by adults but some studies have demonstrated that chick diets have a higher proportion of fish and marine invertebrate prey items. Information is lacking on the supporting habitats and processes for great black-backed gulls at the East Caithness Cliffs SPA, but may indirectly relate to processes that are important for their seabird prey.
Razorbill	Maintain the extent and distribution of the supporting habitats for razorbills within the site. ***and*** Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes. ***and*** Existing water quality should be maintained and any increase in eutrophication or water	Razorbills at the East Caithness Cliffs 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 in deeper pelagic waters, particularly preferring to feed at 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). Razorbills are a pursuit diver which make frequent, shallow dives in the pelagic zone (Thaxter *et al.* 2010; Linnebjerg *et al.* 2013). They are able to forage up to a depth of 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, clupeids, 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). The key supporting processes for razorbill at the East Caithness Cliffs SPA in the terrestrial environment may relate to suitable cliff-nesting habitat. In the surrounding waters by the East Caithness Cliffs 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,

	turbidity, where this could reduce supporting habitats and/or prey, should be avoided.	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 mixing of cool and higher sea surface temperatures exist (Wakefield *et al.* 2017).
Peregrine	Maintain the extent and distribution of the supporting habitats for peregrines within the site. ***and*** Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.	Peregrines require suitable habitat for feeding, breeding, rearing their young and other maintenance activities within the East Caithness Cliffs SPA. Peregrines require habitats in which to nest and open habitats over which to feed. At East Caithness Cliffs SPA peregrines will nest along the cliffs, close to their prey. They lay up to four eggs, usually in early-late April, with chick rearing mainly from May-late July. Peregrines mainly predate birds, such as pigeons, passerines, and in coastal environments predominantly take rock doves, seabirds and waders (Birdlife International, 2022). They are known to reach high speeds when diving for their prey but may also take prey directly from nests on the cliff. Peregrines hunt throughout the day, and can hunt over both land and sea. Information is lacking on the supporting habitats and processes for peregrines at East Caithness Cliffs SPA, but will relate to the processes involved in forming cliff nesting habitat and the availability of ledges on coastal cliffs for nesting and roosting. Supporting processes also relate to the management of open habitats to provide suitable habitat for peregrine prey species.

Annex 2. East Caithness Cliffs NC MPA Conservation Objectives

The box below provides the high-level Conservation Objective statements for the East Caithness Cliffs NC MPA.

The full Conservation Objectives, which includes site-specific advice and information on the qualifying feature that forms this MPA, 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 black guillemot, e.g. detail on the seasonal timings and what the supporting habitats and prey are for black guillemot.

East Caithness Cliffs NC MPA

Protected feature:

- Black guillemot (*Cepphus grille*)

The Conservation Objectives of the East Caithness Cliffs NC MPA is that the protected feature

- so far as already in favourable condition, remains in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a mobile species of marine fauna, means that

a) the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
b) the extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and
c) the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.

Consideration of minor changes to features

Temporary short-term and/or minor changes in black guillemot due to human activity may be considered not to compromise the Conservation Objectives and will be considered on a case by case basis. Assessments should consider the timing, duration and scale of the impact on black guillemot and their ability to recover. These are described in more detail in Annex 3 '*Factors determining the potential for features to recover'.*

Environmental Change	
This Conservation Objective recognises that black guillemot 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 MPA. 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). Any alterations to the black guillemot that are brought about by entirely natural processes are to be disregarded when assessing against the Conservation Objectives. In relation to the East Caithness Cliffs NC MPA and black guillemot, the following effects of climate change are relevant as outlined below. These effects should be taken into account when considering plans and projects within East Caithness Cliffs NC MPA as additional pressures may reduce the habitat's resilience to climate change, and additionally climate change impacts may start to hinder the habitat's ability to recover from human activities.	
Black guillemot	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 MPA due to changes in prey (species, availability and distribution). 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. In coastal breeding sites, increased flooding associated with storm tides may also cause nest site failures in breeding seabirds (Mendel *et al.* 2008). As a result of climate change, the geographic range of black guillemot in the UK is predicted to shrink, so that Shetland, Orkney and the northern tips of mainland Scotland may be the only places holding breeding colonies (Daunt & Mitchell, 2013). In other parts of their range, outwith the UK, black guillemots have been shown to be affected by climate-induced changes in habitat and prey (Divoky, 2011; Buchadas & Hof, 2017).

a) Species is conserved	
The boxes below provide the site specific advice on the '*species is conserved'* element of the Conservation Objectives. Information on '*Continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds'* is provided separately below.	
Site specific advice	**Site specific information**
Ensure the population of black guillemot have the ability to recover to the site reference population. *and* Ensure black guillemots within the MPA are not at significant risk from injury or mortality.	The site reference population for breeding black guillemots at the East Caithness Cliffs MPA is 1600 birds (2014 count), equating to 2.5% of the GB breeding population. Black guillemot populations in both the UK and in Scotland have shown a decrease of around 11% (2015-2021) since Seabird 2000 (1998-2002) (Burnell *et al.* 2023). Reasons for the decline at the associated breeding colony of this MPA is not fully understood. The extent of the supporting habitat is not thought to have changed. Mammalian predation could be a potential pressure on the black guillemots, it is not known the extent of this problem at this site. Changes in their prey availability within their marine foraging areas within the MPA is another possible reason for their decline though it is currently unknown. Plans or projects should ensure that black guillemots are not at significant risk from injury or mortality. For the purposes of the MPA assessments black guillemot are only protected when they are within the site (which extends 2 km out to sea). Any activities that take place within or outside the MPA that could kill or injure black guillemots in the MPA should be considered in assessments.

Continued access to by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds.	
The boxes below provide the site specific advice on the '*continued access…'* element of the Conservation Objectives. Information on '*The species is conserved'* is provided separately above.	
Site specific advice	**Site specific information**
Ensure black guillemots have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site. ***and***	Black guillemots are resident species and will remain near their breeding colonies throughout the year. Their breeding season is from March until end of August. The latest assessment of distribution of nesting black guillemots within the East Caithness Cliffs MPA showed black guillemots were widely distributed along the coastline from Wick to Helmsdale. Particularly dense concentrations were recorded around Lybster and between Dunbeath and Berriedale. Black guillemots use nearshore waters for foraging and will be distributed throughout the East Caithness Cliffs MPA. In the breeding period, the foraging range of black guillemot has a mean maximum of 4.8 km ± 4.3 km

Avoid significant disturbance to black guillemots and ensure individuals can move safely between these areas within the site.	(Woodward *et al.* 2019). Black guillemots predominantly forage in waters up to a dive depth of 50 m (Johnston *et al.* 2018).

b) Extent and distribution of any supporting feature and c) Structure and function of any supporting feature, including any associated processes supporting the species		
Feature	**Site specific advice**	**Site specific information**
Black guillemot	Recover the extent and distribution of the supporting habitats for black guillemots within the site. ***and*** Recover the variety and abundance of food resources and the condition of supporting habitats and associated processes. ***and*** Existing water quality should be conserved and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.	Black guillemots at the East Caithness Cliffs MPA require suitable habitat for breeding, foraging, resting, and other maintenance activities. They will nest amongst boulders and rocks. Black guillemots use areas close to the coast in which to forage and rest. Guillemots have a small foraging radius, and will forage down to 50 m (Johnston *et al.* 2018), feeding primarily in the benthic environment. Black guillemots are also strongly associated with feeding amongst seaweed. Black guillemots are pursuit divers that propel themselves in the water using their wings. Breeding black guillemot in Scotland feed diurnally, predominantly on butterfish, but will also take sandeel, gadiods, blenny, sculpins and flatfish species, depending on what is locally available (Johnston *et al*. 2018). Some invertebrate prey items may also be taken depending on the region, although some studies have shown adults have a higher proportion of invertebrates compared to chicks (Birdlife International, 2022). Both generalist and specialist foraging behaviours have been recorded in black guillemots, and their foraging preferences change seasonally (Johnston *et al.* 2018). Black guillemots have also been recorded using man-made objects in the sea to rest on. The key supporting habitats for black guillemots at the East Caithness Cliffs MPA will relate to the availability of suitable nesting habitat. Supporting processes in the marine environment may relate to water speed, tides, turbidity and water quality. Black guillemots are associated with moderate current speeds, tidal eddys, and tidal streams, with foraging being most common at speeds of 0.5–1 m/s^{-1}, reducing in frequency at higher current speeds of >2 m/s^{-1} (see references within Johnston *et al.* 2018). Densities of black guillemots are greater during the low tide, which may relate to the accessibility of the prey (Johnston *et al.* 2018). Their diving depths and their diving behaviour has been associated with the seafloor (Johnston *et al.* 2018). As with

		other guillemot species that feed in the water column and as a visual feeder, black guillemots could potentially be affected by any increase in turbidity that would affect their ability to successfully forage for their prey (Cook & Burton, 2010).

Annex 3. Supporting information

Factors determining the potential for feature recovery.

Feature	Factors determining the potential for feature recovery
Black guillemot	Black guillemots have an estimated generation length of 9.2 years and age of first breeding is 3-4 years (Bird *et al.* 2020). Their maximum longevity is close to 26 years (Bird *et al.* 2020). Black guillemots are unlike other auk species in that they lay two eggs. Productivity of black guillemots in Scotland, which is derived from regularly monitored colonies mostly located in Orkney and Shetland, was approximately 1.01 chicks fledged per pair per year between 1986 and 2012 (JNCC, 2021). Adult survival is estimated as being 0.87 (Bird *et al.* 2020). 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. As black guillemots have such a restricted foraging range within inshore waters this can make them particularly vulnerable to any pressures that would affect their prey within this environment, as well as being more vulnerable to oil-spill events that more often occur in nearshore waters. As a resident species black guillemots tend to remain near their breeding colonies throughout the year. They have a flightless moult period between mid-August to end of November, during which they will be vulnerable to pressures, which could have a subsequent effect on reproduction or survival. As with other auk species, black guillemots 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).
Cormorant	Cormorants estimated generation length is 8.7 years, with a maximum longevity of 27 years (Bird *et al.* 2020). Age at first breeding is 3 years old (Bird *et al.* 2020). Clutch size is 3-4 eggs (Cramp & Simmons, 2004). After fledging, the young return to the nest site to be fed for a further 40-50 days before they are then independent. As such, the chicks rely on their parents for a lot longer than other seabird species. Cormorants within the colony are not always synchronous, meaning that there can be many different stages of breeding within a cormorant colony, unlike many other seabirds (Mitchell et al. 2004). Adult survival rate is 0.81 (Bird *et al.* 2020) and juvenile survival in the first year is 0.580 (Robinson, 2005). As a long-lived species with high adult survival, any effect on adult mortality can potentially have serious effects on breeding numbers. Pressures such as licensed control, that occur inland and on freshwater environments, could have subsequent effects on their breeding populations. Other pressures during their non-breeding period can also have subsequent effects on the numbers breeding in Scotland. Cormorants will have two kinds of roosts: one diurnal haul-out spots for resting, digesting or wing-drying; and nocturnal roosts, which can contain a large number of individuals. Disturbance to either of these kinds of roosts could impact upon body condition and subsequent survival. Cormorant breeding colonies may persist for several years or, for smaller colonies, cormorants may abandon the site and shift location (Mitchell *et al.* 2004).

	Cormorant plumage requires a 'wing-drying' process after foraging/diving, as their feathers are not fully water-repellent. The amount of time required for 'wing drying' will depend on the weather conditions and how long they were foraging.
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, 2003). 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. 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. Pressures during this moult period, where adults will be flightless for 1-2 months, could have a subsequent effect on reproduction or survival. 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. 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. 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). 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 & Sellers, 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).
Herring gull	Estimated generation length is 14 years, which is longer than other gull species, with a maximum known longevity of around 35 years (Bird *et al.* 2020). Age of first breeding is around 5 years old (Horswill & Robinson, 2015). Clutch size is 3 (2-4) eggs (Cramp & Simmons, 2004). Herring gulls have the ability to lay more than one clutch if the first one has been destroyed, but it depends on the female's physiological condition and replacement clutches will often have smaller or fewer eggs than the first clutch. Incubation takes 28-30 days (from mid-April), chick rearing takes 35-40 days (Cramp & Simmons, 2004). Herring gulls are long-lived species, with an age of 49 having been recorded. Adult survival rates have been estimated to be between 0.83-0.89 (Bird *et al.* 2020; Horswill & Robinson, 2015), though lower survival rates have been estimated for urban nesting herring gulls (Rock & Vaughan, 2013). 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. Northern breeding populations of this species are migratory (del Hoyo *et al.* 1996) although populations in the south are nomadic or completely non-migratory (BirdLife International, 2022). Herring gulls show high site fidelity to their breeding sites. Such high site fidelity may limit individual ability to adapt to changes and hence potential for population recovery from perturbations. Herring gulls feeding in the marine environment are largely surface feeders, scavengers, and predators. Herring gulls are opportunistic foragers and will also forage in terrestrial environments. They have the ability to switch prey depending on what is available, meaning they may be more resilient to change if a particularly prey item decreases.
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 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. 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. 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, 2022). Any pressure (e.g. disturbance) to these moulting flocks may have subsequent effects on their energy expenditure and hence their survival. 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.

Great black-backed gull	Estimated generation length is 12 years, which is longer than most other gull species, with a maximum known longevity of around 30 years (Bird *et al.* 2020). Age of first breeding is around 4-5 years old (Bird *et al.* 2020). Clutch size is generally 2-3 (range of 1-5) eggs (Cramp & Simmons, 2004). Great black-backed gulls have the ability to lay more than one clutch if the first one has been destroyed, but it depends on the female's physiological condition and replacement clutches will often have smaller or fewer eggs than the first clutch. Incubation takes 27-28 days and fledgling period takes around 7-8 weeks (Cramp & Simmons, 2004). Productivity is estimated as being around 1.1 (Horswill & Robinson, 2015). Adult survival rates have been estimated to be between 0.89-0.93 (Bird *et al.* 2020; Horswill & Robinson, 2015). 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. Great black-backed gulls show high site fidelity to their breeding sites. Such high site fidelity may limit individual ability to adapt to changes and hence potential for population recovery from perturbations. Great black-backed gulls are predatory and opportunistic foragers but unlike other gulls such as herring gulls and lesser black-backed gulls, do not appear to readily adapt to feeding in more man-made or urban environments. They have the ability to switch prey depending on what is available, meaning they may be more resilient to change if a particularly prey item decreases but this may depend on the breeding colony. Due to their large size, this may make them able to out-compete other gull species when scavenging, particularly in relation to scavenging from fishing vessels.
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 longevity is recorded as being 51 years (Bird *et al.* 2020). Reproduction rates in fulmars are slow with clutch size being 1 egg, one clutch 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 a new partnership may need to establish. 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. The fulmar non-breeding population will be mixed individuals across many differing 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 within 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. The majority of the fulmar's primary moult is usually post-breeding during September and October (Quinn, 2016). It is thought that individuals undergoing wing moult may remain largely flightless for the period of wing moult (Warham, 1996), thus making them more vulnerable to pressures during this time. In a typical year, a full wing and tail moult should be completed by the end of February (Ginn & Melville, 2000). In unusual years (e.g. 2004, during a winter wreck event), 60% of birds examined from a wreck were still in primary moult in February, compared to 8% in a normal year (van Franeker, 2004), indicating in years of poor food supply the energetically expensive period of moult may be delayed or arrested. Fulmars have a wide prey base (BirdLife International, 2022), so they should be more resilient to changes in prey abundance. However, in the past, population increases and decreases have been linked to changes in anthropogenic food sources such as offal discharges (Tasker, 2004). Fulmars are surface feeders which scavenge on anything that looks like prey. Thus, can be more susceptible to ingesting non-prey items, such as marine litter. Fulmars have the ability to forage widely across large distances (Woodward *et al.* 2019) which means they may be more resilient to changes in prey abundances closer to their breeding colonies.
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. 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, 2022; 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. 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. 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 (Condor, 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).
Peregrine	Peregrines have an estimated generation length of 5.7 years (Bird *et al.* 2020) and have a maximum recorded age of 21 years old (Robinson, 2005). A typical lifespan of peregrine is 7 years old (Robinson, 2005). The age at first breeding is 2 years old with their clutch size generally being between 3-4 eggs. They may be able to lay replacement clutches should loss of first clutch occur early in the incubation period. Peregrine chicks rely on their parents for a few months post-fledging. First year survival in peregrines is around 0.58 (Robinson & Wilson, 2021). Adult survival for peregrines has been estimated as being between 0.79 – 0.83 (Bird *et al.* 2020, Robinson & Wilson, 2021). Survival will also be influenced by the level of persecution in the area. Peregrines have demonstrated they can nest on a variety of man-made structures as well as natural nesting sites, suggesting a degree of adaptability. However, peregrines are highly site faithful, which may limit individual ability to adapt to changes within their breeding areas, and hence potential for population recovery from perturbations. Male peregrines do a lot more of the provisioning than females during the breeding season. This may mean one sex is more vulnerable to particular pressures than others. As some peregrines occupy their territory year round, they are potentially susceptible to disturbance throughout the entire year.

Annex 4: Glossary for Conservation Objectives and References

Conservation Objective term	Definition
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: • 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. • 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. • 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.
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.

Conservation Objective term	Definition
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: • 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. • 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. • Unfavourable declining - One or more of the attribute targets have not been met, evidence suggests that condition will worsen unless remedial action is taken.
Waterfowl	Encompasses seaducks, grebes and divers.

References

Acampora, H. 2017. Interactions between seabirds and pollution in Irish waters. PhD thesis, GMIT, available at: https://research.thea.ie/handle/20.500.12065/2214

Aebischer, N.J. 1993. Immediate and delayed effects of a gale in late spring on the breeding of the Shag *Phalacrocorax aristotelis*. Ibis, 135: 225-232.

Aebischer, N., & Potts, G. R. & Coulson, J. 2008. Site and mate fidelity of Shags *Phalacrocorax aristotelis* at 2 British colonies. Ibis. 137. 19 - 28. 10.1111/j.1474-919X.1995.tb03215.x.

Barrett, RT; Rov, N; Loen, J; Montevecchi, W.A. 1990. Diets of shags *Phalacrocorax aristotelis* and cormorants *P carbo* in Norway and possible implications for gadoid stock recruitment. Marine Ecology Progress Series. 66: 205–218. doi:10.3354/meps066205.

Bédard, J. 1985. Evolution and characteristics of the Atlantic Alcidae. In: Nettleship DN, Birkhead TR (Eds) The Atlantic Alcidae. Academic Press, London, 1-50.

Bicknell, A.W.J., Oro, D., Camphuysen, K. & Votier, S.C. 2013. Potential consequences of discard reform for seabird communities. Journal of Applied Ecology, 50, 649–658.

Bird, J., Martin, R., Akcakaya, H.R, Gilroy, J., Burfield, I., Garnett, S., Symes, A., Taylor, J., Sekercioglu, C. & Butchart, S. 2020. Generation lengths of the world's birds and their implications for extinction risk. Conservation Biology. 10.1111/cobi.13486.

BirdLife International. 2021. European Red list of birds. Accessed at: https://www.birdlife.org/wp-content/uploads/2021/10/BirdLife-European-Red-List-of-Birds-2021.pdf

BirdLife International. 2022. Species factsheets Downloaded from http://www.birdlife.org on 07/05/2022.

BTO. 2014. Peregrine survey results. https://www.bto.org/our-science/projects/peregrine-survey/results

Bradbury, G., Shackshaft, M., Scott-Hayward, L., Rexstad, E., Miller, D. & Edwards, D. 2017. Risk assessment of seabird bycatch in UK waters. Report to Defra. Defra Project: MB0126. Available from:http://sciencesearch.defra.gov.uk/Document.aspx?Document=14236_MB0126Riskassessmentofseabirdbycatchin UKwaters.pdf

Buchadas, A.R.C. & Hof, A.R. 2017. Future breeding and foraging sites of a southern edge population of the locally endangered Black Guillemot *Cepphus grylle*, Bird Study, 64:3, 306-316, DOI: 10.1080/00063657.2017.1358251

Budworth, D., Canham, M., Clark, H., Hughes, B. and Sellers, R.M., 2000. Status, productivity, movements and morality of great Cormorants *Phalacrocorax Carbo* breeding in Caithness, Scotland: a study of a declining population. *Atlantic Seabirds*, *2*(3/4), pp.165-180.

Burnell, D., Perkins, A.J., Newton, S.F., Bolton, M., Tierney, T.D. & Dunn, T.E., 2023. Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015–2021). Lynx Nature Books, Barcelona.

Bustnes, J., Anker-Nilssen, T., Erikstad, K., Lorentsen, S. & Systad, G. 2013. Changes in Norwegian breeding population of European shag correlate with forage fish and climate. Marine Ecology Progress Series. 489. 235-244. 10.3354/meps10440.

Camphuysen, C.J., Schouten, S. & Gronert, A. 2010. Mystery spill of Polyisobutylene (C4H8) off the Dutch coast affecting seabirds in March 2010. *Seabird,* **23,** 143-145.

Carlzon, L., Karlsson, A., Falk, K., Liess, A. & Møller, S., 2018. Extreme weather affects Peregrine Falcon breeding success in South Greenland. *Ornis Hungarica*, *26*(2), pp.38-50.

Cook, A.S.C.P. & Burton, N.H.K. 2010. A review of the potential impacts of marine aggregate extraction on seabirds. Marine Environment Protection Fund Project 09/P130. British Trust for Ornithology. Thetford, Norfolk, UK.

Cooper, M., Bishop, C., Lewis, M., Bowers, D. Bolton, M., Owen, E. & Dodd, S. 2018. What can seabirds tell us about the tide? Ocean Science Discussions. 1-18. 10.5194/os-2018-99.

Conder, P.J. 1950. On the courtship and social displays of three species of auk. British Birds. **43**: 65–69.

Coulson, J.C. 2011. The Kittiwake. T. & A.D. Poyser, London.

Coulson, J.C. 2015. Re-evaluation of the role of landfills and culling in the historic changes in the herring gull (*Larus argentatus*) population in Great Britain. Waterbirds, 38, 339-354.

Cramp, S. & Simmons, K. E. L. (eds.). 2004. BWPi: Birds of the Western Palearctic interactive (DVD-ROM). BirdGuides Ltd, Sheffield

Crespin, L., Harris, M. P., Lebreton, J. D., & Wanless, S. 2006. Increased adult mortality and reduced breeding success with age in a population of common guillemot *Uria aalge* using marked birds of unknown age. *Journal of Avian Biology*, *37*(3), 273-282.

Daunt, F. & Mitchell, I., 2013. Impacts of climate change on seabirds. *MCCIP Science Review*, *2013*, pp.125-133.

Daunt, F., Wanless, S., Greenstreet, S. P., Jensen, H., Hamer, K. C., & Harris, M. P. 2008. The impact of the sandeel fishery closure on seabird food consumption, distribution, and productivity in the northwestern North Sea. Canadian journal of fisheries and aquatic sciences, 65(3), 362-381.

Daunt, F., Bogdanova, M., McDonald C. & Wanless S. 2015. Determining important marine areas used by European shag breeding on the Isle of May that might merit consideration as additional SPAs. JNCC Report No: 556 http://jncc.defra.gov.uk/pdf/Report_556_web.pdf

Davies, J.G., Humphreys, E.M. & PearceHiggins, J.W. 2021. Species factsheet for Great Black-backed Gull. From MarPAMM Lot 5: Projected future vulnerability of seabirds within the INTERREG VA area to climate change. Report to Agri-Food and Biosciences Institute and Marine Scotland Science. BTO, Thetford.

Debout, G., Røv, N. & Sellers, R.M. 1995. Status and population development of cormorants Phalacrocorax carbo carbo breeding on the Atlantic coast of Europe. Ardea 83:47–59

del Hoyo, J.; Elliot, A.; Sargatal, J. 1992. *Handbook of the Birds of the World, Vol. 1: Ostrich to Ducks*. Lynx Edicions, Barcelona, Spain.

del Hoyo, J.; Elliott, A. & Sargatal, J. 1996. Handbook of the Birds of the World, vol. 3, Hoatzin to Auks. Lynx Edicions, Barcelona, Spain: 821pp.

Divoky, G. 2011. Black Guillemots in a melting Arctic: responding to shifts in prey, competitors, and predators. In Watson, R., Cade, T., Fuller, M., Hunt, G. & Potapov, E. (eds) *Gyrfalcons and Ptarmigan in a Changing World*: 125–130. The Peregrine Fund, Boise, ID

Dunnet, G.M. 1991. Population studies of the fulmar on Eynhallow, Orkney, Orkney Islands. *Ibis,* 133, 24-27.

Edwards, E., Quinn, L.R., Wakefield, E.D., Miller, P.I. & Thompson, P.M. 2013. Tracking a northern fulmar from a Scottish nesting site to the Charlie Gibbs Fracture Zone: evidence of linkage between coastal breeding seabirds and Mid-Atlantic Ridge feeding sites. Deep Sea Research Part II: Topical Studies in Oceanography, 98, Part B, 438-444.

Falk, K., Møller, S., Rigét, F. F., Sørensen, P. B. & Vorkamp, K. 2018. Raptors are still affected by environmental pollutants: Greenlandic Peregrines will not have normal eggshell thickness until 2034. – Ornis Hungarica 26(2): 171–176. DOI: 10.1515/orhu-2018-0026

Forrester, R.W., Andrews, I.J., McInerny, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. & Grundy, D.S. 2007. The Birds of Scotland. Scottish Ornithologists' Club, Aberlady.

Fransson, T., Kolehmainen, T., Kroon, C., Jansson, L. & Wenninger, T. 2010. EURING list of longevity records for European birds.

Franeker, J.A., Blaize, C., Danielsen, J., Fairclough, K., Gollan, J., Guse, N., Hansen, P.L., Heubeck, M., Jensen, J.K., Le Guillon, G., Olsen, B., Olsen, K.O., Pedersen, J., Stienen, E.W.M. & Turner, D.M. 2011. Monitoring plastic ingestion by the northern fulmar Fulmarus glacialis in the North Sea. Environmental Pollution, 159, 2609-2615.

Frederiksen, M., Daunt, F., Harris, M.P. & Wanless, S. 2008. The demographic impact of extreme events: stochastic weather drives survival and population dynamics in a long-lived seabird. Journal of Animal Ecology, 77, (5): 1020-1029.

Furness, R.W. & Tasker, M.L. 2000. Seabird-fisheries interactions quantifying the sensitivity of seabirds to reductions in sandeel abundance and identification of key areas for sensitive seabirds in the North Sea. *Marine Ecology Progress Series,* **202**, 253-264

Furness, R.W., Wade, H.M., Robbins, A.M.C. & Masden, E.A. 2012. Assessing the sensitivity of seabird populations to adverse effects from tidal stream turbines and wave energy devices. *ICES Journal of Marine Science*, 69 (8), 1466-1479.

Furness, R.W. 2016. Key pressures and threats faced by marine birds in the UK, conservation action for these birds, and identification of pressures and threats not effectively addressed by existing conservation action. Unpublished report to JNCC.

Furness, R.W. 2015. Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164. (http://publications.naturalengland.org.uk/publication/6427568802627584)

Furness, R.W., Wade, H.M. & Masden, E.A. 2013. Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of Environmental Management*,119: 56-66

Ginn, H.B. & Melville, D.S. 2000 (reprint). Moult in Birds.

Goodship, N. & Furness, R.W. 2019. Seaweed hand-harvesting: literature review of disturbance distances and vulnerabilities of marine and coastal birds. *Scottish Natural Heritage Research Report No. 1096.*

Gremillet, D. 1997. Catch per unit effort, foraging efficiency, and parental investment in breeding great cormorants (*Phalacrocorax carbo carbo*). *ICES Journal of Marine Science* 54(4): 635-644.

Gremillet, D., Liu, H., Le Maho, Y. and Carss, D.N. 2003. Great cormorants and freshwater fish stocks: a pragmatic approach to an ecological issue. *Cormoran* 13(2 (supplement no.58)): 131-136.

Grist, H., Daunt, F., Wanless, S., Nelson, E.J. & Harris, M.P. 2014. Site Fidelity and Individual Variation in Winter Location in Partially Migratory European Shags. PLOS ONE 9(6): e98562. https://doi.org/10.1371/journal.pone.0098562

Harris, M.P. & Wanless, S. 1989. The breeding biology of Razorbills *Alca torda* on the Isle of May. Bird Study. **36** (2): 105–114. *doi*:*10.1080/00063658909477012*.

Harris, M.P. & Wanless, S. 2003. Postfledging occupancy of breeding sites by female common murres (*Uria aalge*). The Auk. 120: 75. *doi*:*10.1642/0004-8038(2003)120[0075:POOBSB]2.0.CO;2*.

Heubeck, M. 2000. Population trends of kittiwake *Rissa tridactyla*, black guillemot *Cepphus grylle* and common guillemot *Uria aalge* in Shetland, 1978-98. Atlantic Seabirds 2, 227-44.

Heubeck, M., Bird, D.R., Harrop, H.R., Harvey, P.V., Mellor, R.M., Suddaby, D., Tasker, M.L. & Uttley, J.D. 1993. An assessment of the impact of the *Braer* oil spill on the Shetland breeding population of tysties *Cepphus grylle*. Rep. to Ecological Steering Group on the Shetland oil spill by Shetland Oil Terminal Environmental Advisory Group/Joint Nature Conservation Committee/Royal Society for the Protection of Birds/Scottish Natural Heritage.

Heubeck, M. & Richardson, M.G. 1980. Bird mortality following the Esso *Bernica* oil spill, December 1978. Scottish Birds 11, 97-108.

Heubeck, M. 1997. The long-term impact of the Esso Bernicia oil spill on numbers of Common Loons *Gavia immer* wintering in Shetland, Scotland. In: Effects of Oil on Wildlife. Fifth International Conference, November 3–6, Monterey, California: 110–122.

Horswill, C. & Robinson R. A. 2015. Review of seabird demographic rates and density dependence. JNCC Report No. 552. Joint Nature Conservation Committee, Peterborough

Humphreys, E.M., Gillings, S., Musgrove, A., Austin, G., Marchant, J. & Calladine, J. 2016. An update of the review on the impacts of piscivorous birds on salmonid populations and game fisheries in Scotland. Scottish Natural Heritage Commissioned Report No. 884.ICES 2013. Report

of the Workshop to review and advise on Seabird Bycatch (WKBYCS) 14-18 October 2013, Copenhagen, Denmark.

ICES 2013. Report of the Workshop to review and advise on Seabird Bycatch (WKBYCS) 14-18 October 2013, Copenhagen, Denmark

IUCN (International Union for Conservation of Nature). 2019. Guidelines for the IUCN Red List categories and criteria. Version 13. IUCN, Gland, Switzerland.

Jarrett, D., Cook, A. S. C. P., Woodward, I., Ross, K., Horswill, C., Dadam, D. & Humphreys, E.M. 2018. Short-Term Behavioural Responses of Wintering Waterbirds to Marine Activity: Quantifying the Sensitivity of Waterbird Species during the Non-Breeding Season to Marine Activities in Orkney and the Western Isles. *Scottish Marine and Freshwater Science,* 7, 9, 88pp. DOI: 10.7489/12096-1.

Joint Nature Conservation Committee (JNCC), 2018. Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement. Accessed at https://hub.jncc.gov.uk/assets/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe

Johnston, D.T., Furness, R.W., Robbins, A.M., Tyler, G., Taggart, M.A. & Masden, E.A., 2018. Black guillemot ecology in relation to tidal stream energy generation: An evaluation of current knowledge and information gaps. *Marine environmental research*, *134*, pp.121-129.

Johnston, D.T., Humphreys, E.M., Davies, J.G & Pearce-Higgins, J.W. 2021. Review of climate change mechanisms affecting seabirds within the INTERREG VA area. MarPAMM report.

Jury, J.A. 1986. Razorbill swimming at depth of 140 m. Br. Birds, 79: 339.

Kelly, E. ed. 2005. *The role of kelp in the marine environment. Irish Wildlife Manuals, No. 17*. National Parks and Wildlife Service, Department of Environment, Heritage and Local

Lee, D-H; Sharshov, K; Swayne, D.E.; Kurskaya, O; Sobolev, I; Kabilov, M; Alekseev, A; Irza, V; Shestopalov, A. 2017. Novel reassortant clade 2.3. 4.4 avian influenza A (H5N8) virus in wild aquatic birds, Russia, 2016. Emerging infectious diseases, 359, 2, 23.

Leopold M.F. & Camphuysen C.J. 2009. Local birds in and around the Offhore Wind Park Egmond aan Zee (OWEZ) (T1). NoordzeeWind Rapport OWEZ R 221 T1 20080201

Lewis, S., Phillips, R.A., Burthe, S.J., Wanless, S. & Daunt, F. 2015. Contrasting responses of male and female foraging effort to year-round wind conditions. Journal of Animal Ecology. 84 (6): 1490–1496. *doi*:*10.1111/1365-2656.12419*.

Linnebjerg JF, Fort J, Guilford T, Reuleaux A, Mosbech A, et al. 2013. Sympatric Breeding Auks Shift between Dietary and Spatial Resource Partitioning across the Annual Cycle. PLOS ONE 8(8): e72987. https://doi.org/10.1371/journal.pone.0072987

Macdonald, M.A. 1977. The pre-laying exodus of the Fulmar *Fulmarus glacialis*. Ornis Scandinavica, 8, 33-38.

Mallory, M.L., Akearok, J.A., Edwards, D.B., O'Donovan, K. & Gilbert, C.D. 2008. Autumn migration and wintering of northern fulmars (*Fulmarus glacialis*) from the Canadian high Arctic. Polar Biology, 31, 745-750.

Marion, L. & Bergerot, B. 2018. Northern range shift may be due to increased competition induced by protection of species rather than to climate change alone. Ecology and Evolution. 8. 10.1002/ece3.4348.

Mendel, B, Sonntag, N., Wahl, J., Schwemmer, P., Dries, H., Guse, N., Müller, S. & Garthe, S. 2008. Profiles of seabirds and waterbirds of the German North and Baltic Seas: Distribution, ecology and sensitivities to human activities within the marine environment. Bonn, Bundesamt für Naturschutz.

Mitchell, I., Daunt, F., Frederiksen, M. & Wade, K. 2020. Impacts of climate change on seabirds, relevant to the coastal and marine environment around the UK.

MMO. 2018. Displacement and habituation of seabirds in response to marine activities. A report produced for the Marine Management Organisation. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/715604/Displacement_and_habituation_of_seabirds_in_response_to_marine_activities.pdf

NatureScot. (2022). Disturbance distances in selected Scottish bird species – NatureScot guidance. https://www.nature.scot/doc/disturbance-distances-selected-scottish-bird-species-naturescot-guidance

Nettleship, D.N.; Boesman, P.; Garcia, E.F.J. 2018. Black Guillemot (*Cepphus grylle*). Barcelona

North East Scotland Raptor Study Group. 2015. Peregrines in North-east Scotland in 2014 - further decline in the uplands. *Scottish Birds 35*, 10–14.

Nordström, M., Högmander, J., Laine, J., Nummelin, J., Laanetu, N. & Korpimäki, E. 2003. Effects of feral mink removal on seabirds, waders and passerines on small islands in the Baltic Sea. *Biological Conservation*, *109*(3), pp.359-368.

O'Hanlon, N., James, N., Masden, E. & Bond, A. 2017. Seabirds and marine plastic debris in the northeastern Atlantic: A synthesis and recommendations for monitoring and research. Environmental Pollution. 231. 10.1016/j.envpol.2017.08.101.

Okill, J.D. 2002. Black guillemot *Cepphus grylle.* In: Wernham, C.V., Toms, M.P., Marchant, J.H., Clark, J.A., Siriwardena, G.M. & Baillie, S.R. (eds) The Migration Atlas: movements of birds of Britain and Ireland. T. & A.D. Poyser, London.

Ollason, J.C. & Dunnet, G.M. 1988. Variation in breeding success in fulmars. *Reproductive Success* (ed. T.H. Clutton-Brock), pp. 268-278. University of Chicago Press, Chicago

OSPAR Commission. 2009. Background document for black-legged kittiwake (*Rissa tridactyla tridactyl*a). OSPAR Commission Biodiversity Series.

Peschko, V., Mendel, B., Müller, S., Markones, N., Mercker, M. & Garthe, S. 2020. Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research, 162, p.105157.

Quinn, L.R. 2014. Intra- and inter-colony differences in non-breeding strategies in the Northern Fulmar, *Fulmarus glacialis*. Unpublished PhD Thesis, University of Aberdeen

Quinn, L. R., Meharg, A. A., van Franeker, J. A., Graham, I. M., & Thompson, P. M. 2016. Validating the use of intrinsic markers in body feathers to identify inter-individual differences in non-breeding areas of northern fulmars. Marine Biology, 163, [64]. https://doi.org/10.1007/s00227-016-2822-1

Robinson, R.A. 2005. *BirdFacts: profiles of birds occurring in Britain & Ireland*. BTO, Thetford (http://www.bto.org/birdfacts, accessed on 03 May 2022).

Robinson, R.A. and Wilson, M. (2021), Contrasting long-term trends in age-specific survival of Peregrine Falcons (Falco peregrinus) in Britain using smoothed estimates of recovery probabilities. Ibis, 163: 890-898. https://doi.org/10.1111/ibi.12943

Rock, P. & Vaughan I.P. 2013. Ringing & Migration, 2013 Vol. 28, No. 1, 21–29, http://dx.doi.org/10.1080/03078698.2013.811179

Ropert-Coudert Y., Kato A., Robbins A. & Humphries G.R.W. 2018. The Penguiness book. World Wide Web electronic publication (http://www.penguiness.net), version 3.0, October 2018. DOI:10.13140/RG.2.2.32289.66406

Ronconi, R.A. & Clair, C.C.S. 2002. Management options to reduce boat disturbance on foraging black guillemots (*Cepphus grylle*) in the Bay of Fundy. Biological Conservation 108: 265-271.

RSPB. 2014. *Birdcrime 2014: offences against wild bird legislation in the UK*.

RSPB. 2022. Peregrine Falcon Threats. Accessed at https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/peregrine/threats/#:~:text=The%20largest%20continuing%20threat%20to,subject%20to%20interference%20and%20killing.

Russell, D.J.F., Wanless, S., Collingham, Y.C., Huntley, B. & Hamer, K.C. 2015. Predicting future European breeding distributions of British seabird species under climate change and unlimited/no dispersal scenarios. Diversity – Basel 7: 342-359.

Sandvik, H., Reiertsen, T.K., Erikstad, K.E., Anker-Nilssen, T., Barrett, R.T., Lorentsen, S.H., Systad, G.H. & Myksvoll, M.S. 2014. The decline of Norwegian kittiwake populations: modelling the role of ocean warming. Climate Research, 60, 91-102.

Sandvik, H., Erikstad, K.E., Barrett, R.T. & Yoccoz, N.G. 2005. The effect of climate on adult survival in five species of North Atlantic seabirds. Journal of Animal Ecology, 74(5), 817- 831.

Sellers, R. M. 2020 Continuing decline of cormorants in Caithness. Scottish Birds 40: 307-314

Snow, D.W. & Perrins, C.M. 1998. *The Birds of the Western Palearctic, Volume 1: Non-Passerines*. Oxford University Press, Oxford.

Stanbury, A., Burns, F., Aebischer, N., Baker, H., Balmer, D., Brown, A., Dunn, T., Lindley, P., Murphy, M., Noble, D., Owens, R., Quinn, L. 2024. The status of the UK's breeding seabirds: an addendum to the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, *117*, pp.471-487.

Strix. 2012. Developing and testing the methodology for assessing and mapping the sensitivity of migratory birds to wind energy development. BirdLife International, Cambridge.

Stroud,D.A., Chambers,D., Cook,S., Buxton,N., Fraser,B., Clement,P., Lewis,I., Mclean,E., Baker,H. & Whitehead,S. 2001. The UK SPA network: its scope and content, 1-3 ed Peterborough, UK.

Svendsen, N.B., Herzke, D., Harju, M., Bech, C., Gabrielsen, G.W. & Jaspers, V.L.B., 2018. Persistent organic pollutants and organophosphate esters in feathers and blood plasma of adult kittiwakes (*Rissa tridactyla*) from Svalbard–associations with body condition and thyroid hormones. *Environmental research*, *164*, pp.158-164.

Tartu, S., Goutte, A., Bustamante, P., Angelier, F., Moe, B., Clément-Chastel, C., Bech, C., Gabrielsen, G.W., Bustnes, J.O. & Chastel, O. 2013. To breed or not to breed: endocrine response to mercury contamination by an Arctic seabird. *Biology letters*, *9*(4), p.20130317.

Tartu, S., Lendvai, A.Z., Blevin, P., Herzke, D., Bustamante, P., Moe, B., Gabrielsen, G.W., Bustnes, J.O. & Chastel, O. 2015. Increased adrenal responsiveness and delayed hatching date in relation to polychlorinated biphenyl exposure in Arctic-breeding black-legged kittiwakes (Rissa tridactyla). General and Comparative Endocrinology, 219, 165-172

Tasker, M. L., Camphuysen, C.J., Cooper, J., Garthe, S., Montevecchi, W.A. & Blaber, S.J.M. 2000. The impacts of fishing on marine birds. ICES Journal of Marine Science, 57, 531–5

Tasker, M. 2004. Northern fulmar. In Mitchell, P.I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. (eds.) 2004. Seabird Populations of Britain and Ireland. Poyser, London.
Thaxter, C. B., Wanless, S., Daunt, F., Harris, M. P., Benvenuti, S., Watanuki, Y., & Hamer, K. C. 2010. Influence of wing loading on the trade-off between pursuit-diving and flight in common guillemots and razorbills. *Journal of Experimental Biology*, *213*(7), 1018-1025.

Thompson, P.M. & Ollason, J.C. 2001. Lagged effects of ocean climate change on fulmar population dynamics. Nature, 413, 417-420

Tremlett, C.J., Morley, N., and Wilson, L.J. 2024. UK seabird colony counts in 2023 following the 2021- 22 outbreak of Highly Pathogenic Avian Influenza. RSPB Research Report 76. RSPB Centre for Conservation Science, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL

US Navy 2011. Environmental science panel for marbled murrelet underwater noise injury threshold – final summary report (https://truthout.org/wp-content/uploads/legacy/documents/6_MARBLED-MURRELET-UNDERWATER-NOISE-INJURY-THRESHOLD-SCIENCE-PANELConferenceSummaryReport_090711.pdf)

Vanermen, N., Brabant, R., Stienen, E., Courtens, W. & Onkelinx, T. 2016. Incorporating data uncertainty when estimating potential vulnerability of Scottish seabirds to marine renewable energy developments.
https://www.macarthurgreen.com/files/Incorporating_Data_Uncertainty_when_Estimating_Potential_Vulnerability_of_Scottish_Seabirds_to_Marine_Renewable_Energy_Developments.pdf

Votier, S.C., Birkhead, T.R., Oro, D., Trinder, M., Grantham, M.J., Clark, J.A., McCleery, R.H. & Hatchwell, B.J. 2008. Recruitment and survival of immature seabirds in relation to oil spills and climate variability. Journal of Animal Ecology, 77, 974-983.

Votier, S.C., Hatchwell, B.J., Beckerman, A., McCleery, R.H., Hunter, F.M., Pellatt, J., Trinder, M. & Birkhead, T.R., 2005. Oil pollution and climate have wide-scale impacts on seabird demographics. *Ecology letters*, *8*(11), pp.1157-1164.

Wakefield, E. Ellie, O., Baer, J., Carroll, M., Daunt, F., Dodd, S., Green, J. Guilford, T., Mavor, R., Miller, P., Newell, M., Newton, S., Robertson, G., Shoji, A., Soanes, L., Votier, S., Wanless, S. & Bolton, M. 2017. Breeding density, fine-scale tracking and large-scale modeling reveal the regional distribution of four seabird species. Ecological applications: a publication of the Ecological Society of America. 27. 10.1002/eap.1591.

Wanless, S. & Harris, M.P. 2004. European Shag *Phalacrocorax aristotelis*. In: Mitchell, P.I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. (Eds.) Seabird Populations of Britain and Ireland. London, UK: T. & A.D. Poyser.

Wanless, S., Harris, M. P. and Morris, J. A. 1990. A comparison of feeding areas used by individual common murres (*Uria aalge*), razorbills (*Alca torda*) and an Atlantic puffin (*Fratercula arctica*) during the breeding season. Col. Waterbirds 13, 16-24.

Wanless, S.; Harris, M. P. 1997. *Phalacrocorax aristotelis* Shag. *Birds of the Western Palearctic Update* 1(1): 3-13.

Wanless, S., Harris M.P., & Morris J.A. 1991. Foraging range and feeding locations of shags *Phalacrocorax aristotelis* during chick rearing. Ibis, 133, 30-36

Wanless, S., Frederiksen, M. Walton, J. & Harris, M. 2009. Long-term changes in breeding phenology at two seabird colonies in the western North Sea. Ibis. 151. 274 - 285. 10.1111/j.1474-919X.2008.00906.x.

Watanuki, Y., Daunt, F., Takahashi, A., Wanless, S. & Sato, K. 2008. Microhabitat use and prey capture of a bottom feeding top predator, the European Shag, shown by camera loggers. Marine Ecology Progress Series, 356, 283-293

White, C. M., N. J. Clum, T. J. Cade, & W. G. Hunt. 2020. Peregrine Falcon (*Falco peregrinus*), version 1.0. In: S. M. Billerman (ed.), *Birds of the World*, Cornell Lab of Ornithology, Ithaca, NY.

White, C.M., Christie, D.A. & de Juana, E. 2013. Peregrine Falcon (*Falco peregrinus*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (eds), *Handbook of the Birds of the World Alive*, Lynx Edicions, Barcelona.

Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening. BTO Research Report No. 724.

Žydelis, R., Small, C., & French, G. 2013. The incidental catch of seabirds in gillnet fisheries: A global review. *Biological Conservation*, 162, 76-88.