Conservation and Management Advice

BLUEMULL AND COLGRAVE SOUNDS SPA

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

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

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

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

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

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Contents

1 Overview of document

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

Annex 1 sets out the Bluemull and Colgrave Sounds SPA Conservation Objectives. Annex 2 provides supporting information relating to the protected feature.

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

2 Introduction

2.1 Purpose statement

The Bluemull and Colgrave Sounds SPA has been designated to protect breeding red-throated divers and their supporting habitats. By doing so it contributes to the Scottish, UK and OSPAR MPA networks, the conservation of the wider marine environment around Scotland, and progress towards Good Environmental Status within the North-East Atlantic marine region.

The main purpose of the Bluemull and Colgrave Sounds SPA is to contribute to the Favourable Conservation Status of red-throated diver in the Atlantic Biogeographic Region. The Conservation Objectives form the framework for establishing appropriate management measures and assessing all future plans and projects that have the potential to affect the protected feature of the MPA.

2.2 Conservation benefits

The conservation benefits of the Bluemull and Colgrave Sounds SPA are:

- Protecting foraging areas used by over 190 pairs of breeding red-throated divers (an Annex 1 rare and vulnerable species), approximately 15% of the GB population, at their most northerly site. This represents the second largest population of breeding red-throated divers in the UK. These birds breed on freshwater lochs and pools within a 10km radius of the SPA (e.g. on Yell, Unst, and Fetlar) and forage in the marine waters within this SPA.

- Protecting sheltered waters with rich marine habitats that support a diversity of shellfish, other invertebrates, and fish, including nursery areas for species such as sandeel, which the red-throated divers feed on and will catch for their young.

2.3 Wider benefits

Red-throated divers at the Bluemull and Colgrave Sounds SPA contribute to 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 red-throated divers at the Bluemull and Colgrave Sounds SPA contribute to benefits for people. There can be many complex interactions and dependencies between the protected feature, their functions, associated natural resources and the benefits we gain from them.

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

In terms of resources, the MPA comprises a rich diversity of marine habitats. These include areas of shallow waters in voes (inlets) and deeper water in the sounds between the islands. There are numerous sandy bays and voes offering shelter and the mixed sediment types of the seabed within this MPA support a diversity of shellfish, other invertebrates, and fish, including nursery areas for species such as sandeels. The MPA also supports excellent foraging for bird species, including breeding red-throated divers.

The rich and varied natural resources present within the MPA give rise to a wide range of benefits to people. The unique seascapes and wildlife within the MPA provide opportunities for tourism, recreation, wildlife watching, and annual events such as the ‘eela’ (rod fishing) competition and small boat races, all of which encourage local jobs and businesses. Fisheries and supporting businesses from local communities within and around the MPA utilise and benefit from the wildlife and the area’s fish and shellfish resources. The MPA is a socially valued place by the local community, as people have worked the waters and shores of the MPA from when the first people settled on the islands. 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 benefits that arise from the functions and natural resources of the MPA are typically small in the context of the whole of Scotland, but some are of greater importance for this MPA and the people that use it. There is potential for benefits to be enhanced. This may be achieved by improving the quantity or quality (health) of the protected feature itself and/or through promoting, for example, more recreational enjoyment or use of natural resources that is compatible with the site’s Conservation Objectives.

Figure 1. Benefits to people associated with the protected feature of the Bluemull and Colgrave Sounds SPA.

2.4 Contribution to policy commitments

Managing the Bluemull and Colgrave Sounds SPA to maintain the breeding red-throated diver population in favourable condition will ensure the continued provision of the benefits above as well as the MPA's contribution to:

- An ecologically coherent network of MPAs which are well managed under the OSPAR convention and national legislation.
- Achieving Favourable Conservation Status for the protected features in the Atlantic Biogeographic Region.
- Progress towards achieving Good Environmental Status, particularly 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 Bluemull and Colgrave Sounds SPA in relation to activities that may affect the protected feature. More detailed advice can be provided to public authorities to inform their decision making as required. In doing this, our aim is to ensure the Conservation Objectives for the protected feature are met.

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

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

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

4 Protected feature and status

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

Red-throated divers in the Bluemull and Colgrave Sounds SPA are protected within the SPA throughout the year, irrespective of the season for which they qualified as a protected feature.

Table 1 provides a summary of red-throated divers within the MPA, their condition within the site (where known) based on the latest NatureScot Site Condition Monitoring assessment, and the broader conservation status of red-throated divers.

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

Table 1. Condition status of red-throated diver at Bluemull and Colgrave Sounds SPA. Feature condition refers to the condition of red-throated diver at a site level[2]. Broader conservation status is the overall conservation status of red-throated diver within the UK and Europe. No assessment on the condition of red-throated diver at the Marine Atlantic Biogeographic Region scale is available.

Protected Feature	Feature condition at site	Assessment date[3]	Broader conservation status	
			UK[3]	European region[4]
Red-throated diver (breeding season)	Favourable	*Not yet assessed*	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 each SPA should make to achieving Favourable Conservation Status for red-throated diver. They provide the framework for the setting of site conservation measures (management) and for the Habitats Regulations Appraisal of projects and plans.

The Conservation Objectives for the Bluemull and Colgrave Sounds SPA are provided in Annex 1.

5.2 Relationship between feature condition and Conservation Objectives

The Conservation Objectives seek to *maintain* protected SPA features where evidence exists that it 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 site selection. 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.

Bluemull and Colgrave Sounds SPA was designated in December 2020. Red-throated divers have not been assessed since designation however corroborative evidence suggests there is no reason to suspect deterioration in condition since designation. Therefore, the Conservation Objectives for the Bluemull and Colgrave Sounds SPA seek to *maintain* this condition.

5.3 Overlapping Marine Protected Areas

The following MPAs overlap with the Bluemull and Colgrave Sounds SPA:

[2] The protected feature has not been assessed since designation, however corroborative evidence suggests there is no reason to suspect deterioration in condition since site selection (SNH, 2019). Hence, the feature condition is provided as condition at site selection.
[3] Based on Birds of Conservation Concern 5 (BoCC5), for further details on definitions see Stanbury *et al.* 2021.
[4] Based on BirdLife International, 2021.

- Fetlar SPA
- Fetlar to Haroldswick MPA

Conservation measures in the overlapping marine areas need to ensure the Conservation Objectives of the Bluemull and Colgrave Sounds SPA and the overlapping sites are met. Priority would be given to the SPA features. There are currently no known management conflicts between the protected features of the MPAs. Site information for the protected sites overlapping the Bluemull and Colgrave Sounds SPA, including the Conservation Objectives, are available on SiteLink.

In addition, the following relevant MPA is adjacent to the Bluemull and Colgrave Sounds SPA:

- Hascosay SAC

Otter are a protected feature at Hascosay SAC and may also forage in the Bluemull and Colgrave Sounds SPA, and therefore any conservation measures in place for otters at Hascosay SAC should also be considered in relation to the Conservation Objectives for Bluemull and Colgrave Sounds SPA (and vice versa).

6 Feature sensitivity

The following section provides an overview of the pressures associated with human activities that are most relevant to the protected feature. Further information on feature sensitivity, will be made available on Marine Scotland's Feature Activity Sensitivity Tool (FeAST)[5]. The information in FeAST will reflect our current understanding of the interactions between activities, pressures and features. It highlights that activities can give rise to a range of pressures, which the protected feature 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 Red-throated diver (breeding)

Red-throated divers are considered sensitive to mortality through entanglement in various types of fishing gears and incidental bycatch (Mendel *et al.* 2008; Dierschke *et al.* 2012). Red-throated divers exhibit behavioural sensitivity to visual disturbance (Jarrett *et al.* 2018). During the breeding season their more restricted distribution within sheltered inshore waters will limit potential exposure to large marine developments, however they are known to exhibit strong displacement associated with various marine developments (Furness *et al.* 2013; Cook & Burton 2010). Red-throated divers are also sensitive to pressures affecting prey availability (Guse *et al.* 2009). (*See also Sandeel sensitivity assessment in FeAST).*

7 Management

7.1 Conservation Measures

The following conservation measures are currently in place for the Bluemull and Colgrave Sounds SPA:

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

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

Other relevant measures include:

- Under the Shetland Regulating Order, the use of hydraulic dredges is not permitted within Shetland coastal waters;
- Creel fishing is regulated in Shetland by the Shetland Shellfish Management Organisation (SSMO), meaning there is strict local control on the number of licensed vessels in the fishery;
- The use of bottom set nets is prohibited by Regulation EU 227/2013.

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 the protected feature and activities associated with pressures that the feature is 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 the protected feature and relevant activities, and our understanding of the relationships between the feature 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. Where management measures are required, the development of these would be undertaken through discussion with the relevant stakeholders.

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

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 protected feature. 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 and Technical Standards for Scottish Finfish Aquaculture.

Table 2. NatureScot's advice to support management for the Bluemull and Colgrave Sounds SPA for activities which are considered capable of affecting the protected feature.

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**
	Red-throated diver
Aquaculture - finfish*	**No additional management** required for existing finfish farms provided management of entanglement pressures at finfish farms within the SPA follow current and evolving best practice with respect to cage mesh size and tensioning, and the use of anti-predator nets. **Remove or avoid pressures** (entanglement due to set nets) in new finfish farms by prohibiting the use of set (gill) nets for recapture of escaped farmed stock within the SPA. **Reduce or limit pressures** (entanglement, disturbance, reduction of prey supporting habitat) associated with new finfish farms, consented inactive, or existing fish farms that are proposing to expand or relocate. Appropriate mitigation may include: • Application of best practice, monitoring and reporting of incidences of bird entanglement, ensuring cage mesh sizes and tensioning are appropriate. • Seasonal limitation and/or defining routes for maintenance vessels, in particular to avoid important foraging areas for breeding red-throated divers. • Spatial limitation to avoid damaging or restricting access to prey-supporting habitats of red-throated divers. • Careful siting of new finfish farms.

Activities considered capable of affecting the protected features	Advice to support management Red-throated diver
Aquaculture – shellfish*	**No additional management** required for existing shellfish farms provided management of entanglement pressures at shellfish farms within the SPA follow current and evolving best practice with respect to net mesh sizes and tensioning and use of anti-predator nets. **Reduce or limit pressures** (entanglement, disturbance, reduction of prey supporting habitat) associated with proposed new shellfish farms or renewed use of vacant sites. Appropriate mitigation may include: • Application of best practice, monitoring and reporting of incidences of bird entanglement, ensuring cage mesh sizes and tensioning are appropriate; • Seasonal limitation and/or defining routes for maintenance vessels, in particular to avoid important foraging areas for breeding red-throated divers; • Spatial limitation to avoid damaging or restricting access to prey-supporting habitats of red-throated divers; and • Careful siting of new shellfish farms.
Boat use associated with both commercial and recreational activities (with the exception of Ferry routes – see separate advice)	**Reduce or limit pressures** (disturbance) associated with vessel movement from 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 breeding red-throated divers; and/or • production of vessel management plans which may include agreed routes and potential speed restrictions.
Dredging/extraction of material (includes navigational, maintenance, and capital dredging)*	**No additional management** for existing maintenance dredging (ports and harbours). **Reduce or limit pressures** (disturbance, damage of supporting habitat) associated with new capital dredging projects and associated maintenance dredging through appropriate mitigation such as: • spatial limitations to avoid damaging supporting habitat within foraging dive ranges of red-throated divers and/or; • seasonal restrictions.
Ferry routes	**No additional management** is recommended for existing ferry routes. **Reduce or limit pressures** (disturbance) associated with new ferry routes.

Activities considered capable of affecting the protected features	Advice to support management Red-throated diver
Fishing - demersal mobile/active gear/benthic trawls (including mechanical trawls)*	Whilst we have limited understanding about the extent of interactions between benthic fisheries and prey supporting habitat within the site, we **recommend** that 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 for red-throated divers. **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).
Fishing – hydraulic dredges*	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. We **recommend** that 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 for red-throated divers. **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).
Fishing – static gear*	**Remove or avoid pressures** (entanglement) associated with the use of all static nets (whether bottom set or in the water column). Spatial exclusion of static nets in areas identified as being important for red-throated divers (as identified from habitat and dive depth references) between April to mid-September each year is **recommended**.
Fishing – diver collection of bivalves	**No additional management** required for current levels of small scale diver collection of bivalves by hand. **Reduce or limit pressures** (disturbance) from all hydraulic methods of collection of bivalves (e.g. diver or vessel) is **recommended.**
Fishing – hand gathering of mussels	**No additional management** required for current levels of small scale hand gathering of winkles (whelks) and razor clams (spoots).
Fishing – pelagic*	**Remove or avoid pressures** (removal of key prey species) associated with fishing for sandeels. There is no current targeted sandeel fishery within the SPA, this position should be retained. Pelagic fishing for herring/sprat may occur within or around the SPA. We **recommend** that a principal objective of the management of the fishery should be ensuring that the fishing activity does not prevent or disrupt the availability of prey species for red-throated divers, i.e. it should be considered as part of a broader ecosystem-based approach to

Activities considered capable of affecting the protected features	Advice to support management Red-throated diver
	management of this fishery.
Marine disposal sites*	**Reduce or limit pressures** (disturbance, smothering of prey supporting habitat, changes in water clarity) associated with new capital dredging projects and associated maintenance dredging within or adjacent to the SPA.
Ports and harbours	**No additional management** for established activities at ports and harbours within the Bluemull and Colgrave Sounds SPA. **Reduce or limit pressures** (disturbance, displacement, loss or damage to prey-supporting habitat) associated with new development proposals or expansion of ports and harbours within or adjacent to the SPA. Appropriate mitigation may include: • spatial limitations to avoid damaging supporting habitat within foraging dive range of red-throated divers and/or; • seasonal restrictions during construction to avoid periods when birds are present.
Renewable energy – (tidal, wind, wave)	**No additional management** required for the consented Bluemull 5 device tidal array scheme. **Reduce or limit pressures** (disturbance, displacement, collision associated with new tidal proposals through effective mitigation measures. **Reduce or limit pressures** (disturbance, displacement, collision) for any new wind or wave proposals through effective mitigation measures.
Tourism & recreation* (includes angling, yachting, sea kayaking, sail boats, motor boats)	**No additional management** for existing recreational activities (includes yachting, angling, sea kayaking, leisure boating) 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. **Reduce or limit pressures** (disturbance) where an increase by water-borne recreational activities demonstrates there is evidence of impacts at particular locations and/or if there is a major increase in intensity of these pursuits within the SPA. There would be potential for some zonation of measures across the site given that red-throated divers exhibit behavioural sensitivity to disturbance.
Seaweed harvesting	**No additional management** is recommended for existing seaweed harvesting activities for hand-harvesting. **Reduce or limit pressures** (disturbance) associated with new seaweed harvesting developments.

Activities considered capable of affecting the protected features	Advice to support management Red-throated diver
	Remove or avoid pressures (disturbance, removal of prey supporting habitat) associated with mechanical harvesting of seaweed (in particular of kelp).
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. The SMWWC highlights why birds are sensitive to disturbance and offers practical advice on how to avoid 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. There would be potential for some zonation of measures across the site given that red-throated divers exhibit behavioural sensitivity to disturbance.

Table 3. Activities that are considered not likely to affect the protected feature (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 feature.
Cables and pipelines (power interconnectors, gas and oil pipelines)	There are pressures associated with vessel movements (covered in Table 2) and there is a potential both temporary and permanent seabed habitat destruction. However, due to the scale of it and the low occurrence of this activity in this area currently, we consider this poses a low risk to conservation objectives.
Fishing – static gear – Creels (including lobster, crabs and *Nephrops*)	Creels (including lobster, crabs and *Nephrops*). Fishing using creels is widespread throughout the MPA. Whilst there is the potential for entanglement for the protected feature, the occurrence is thought to be rare and therefore we consider this method poses a low risk to the protected feature. Pressures associated with the vessel traffic from this pressure is covered under Table 2.

[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).

Fishing – mobile gear – line fishing (including jigging)	Pelagic and bottom-set long-line fisheries are largely restricted to offshore waters and therefore at present pose a low risk to the protected feature. Pressures associated with the vessel traffic from this pressure is covered under Table 2.

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 red-throated divers.
- Further ecological studies of red-throated diver diets, habitat preferences and use, and movements between the breeding sites and the marine foraging waters of the Bluemull and Colgrave Sounds SPA.
- Studies of the energetic/survival consequences of red-throated divers' behavioural sensitivity to visual disturbance, including within the Bluemull and Colgrave Sounds 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 red-throated divers.
- 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.

Annex 1. Bluemull and Colgrave Sounds SPA Conservation Objectives

The box below provides the high-level Conservation Objective statements for the Bluemull and Colgrave Sounds SPA.

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

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

A definition of the terms used is in the Glossary (Annex 3).

Bluemull and Colgrave Sounds SPA
Qualifying feature: • Red-throated diver (*Gavia stellata*)
1. To ensure that red-throated diver at the Bluemull and Colgrave Sounds SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status. 2. To ensure that the integrity of the Bluemull and Colgrave Sounds SPA is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for red-throated diver: 2a. The population of red-throated diver is a viable component of the site. 2b. The distribution of red-throated diver throughout the site is maintained by avoiding significant disturbance of the species. 2c. The supporting habitats and processes relevant to red-throated diver and their prey/food resources are maintained.

1. To ensure that red-throated diver at the Bluemull and Colgrave Sounds SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
Achieving Favourable Conservation Status (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). 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 red-throated divers within each individual SPA in this Biogeographic Region. The focus of the appraisal should be at a site level. If the site Conservation Objectives are met then the site's contribution to FCS across the red-throated diver's biogeographic range will be maintained. 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 red-throated divers 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 the Bluemull and Colgrave Sounds SPA is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for red-throated diver.
The aim at this SPA is to maintain red-throated diver in a favourable condition as a contribution to its wider favourable conservation status. When carrying out appraisals of plans or projects, or determining whether management measures are required, the focus is maintaining site integrity, specifically by meeting the Objectives outlined in 2a, 2b and 2c. If these are met then site integrity will continue to be maintained. Note that not all of these may be relevant for every activity being considered. Any impacts on the Objectives shown in 2a, 2b or 2c must not persist such that they prevent the maintenance of site integrity.

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

Environmental changes

These Conservation Objectives recognise that red-throated divers 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 red-throated diver 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 red-throated diver 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 red-throated diver 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 red-throated diver's 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 red-throated diver's 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 red-throated diver associated with this site (either by making a positive contribution or having a negative impact). Wider scale impacts may affect the ability of red-throated diver 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 Bluemull and Colgrave Sounds SPA and red-throated divers, 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 red-throated divers resilience to climate change, and conversely climate change impacts may start to hinder the their ability to recover from human activities.

- Under climate change, sea temperatures are predicted to increase, sea levels are rising and there could be increases in the frequency of stormy conditions. Any of these factors could cause changes in bird abundance and distribution at the SPA due to changes in prey (species, availability and distribution), both in marine waters and in intertidal areas.
- Long-term population variations in breeding populations of red-throated divers have been identified as corresponding with a large scale climatic pattern but the mechanism for any causal link has not been established (Schmutz, 2014). It is unclear what effects climate change might have on breeding red-throated divers in Scotland.

2a. The population of red-throated diver is a viable component of the site.

This objective seeks to specifically protect red-throated divers from ***significant*** mortality, injury or removal that can lead to a long-term decline of the feature(s) within the site. It protects red-throated divers 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 or long-term reduction or continued decline in the population and consequently, reduction in the contribution the Bluemull and Colgrave Sounds SPA makes to the maintenance of red-throated divers in their natural range in the UK. It should be ensured that red-throated divers are protected from anthropogenic pressures that could lead to a significant long-term decline in numbers using the site.

At a site level, red-throated divers are 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 Bluemull and Colgrave Sounds SPA, this means that red-throated divers should be able to breed successfully and should subsequently be in good enough body condition to be able to migrate to their overwintering sites.

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 the red-throated diver's 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 red-throated divers to recover.
- avoiding effects within and outwith the site that could lead to a permanent reduction in the populations of red-throated divers

through mortality, injury, or impacts caused by disturbance, displacement, barrier effects or reduction in mobile prey resources.

- maintaining red-throated divers 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 red-throated divers should be maintained at or above site reference populations, as detailed below. The site reference population may be revised from the baseline at designation where a) there is evidence to show that a population's size has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally equivalent to at least one generation length for the given species) and/or b) to reflect any wider strategic objectives for the species (e.g. national or international species action plan). Where there is evidence to show that red-throated divers have 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.

Red-throated divers are protected throughout the whole site, throughout the year. This means that irrespective of the season for which they are designated, red-throated divers 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 red-throated divers can fully recover. Factors limiting the recovery of red-throated divers 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); disease, and pollution. Indirect mortality can arise from reduction of prey or prey-supporting habitats (e.g. through harvesting; physical removal of or damage to seabed; nutrient enrichment; changes to water temperature, salinity, or flows; introduction of invasive non-native species (INNS); pollution). Indirect mortality can arise from reduced ability to capture or access prey arising from e.g. increased water turbidity or displacement from foraging areas.

The site-specific information includes a site reference population that is considered the most appropriate for assessments of plans and projects. Where this is based on the citation population at classification or recent surveys, the site reference population is rounded using standard procedures (Stroud *et al.* 2001).

Site-specific advice	**Site-specific information**
Maintain the population	The site reference population for red-throated divers at the Bluemull and Colgrave Sounds SPA is 190

of breeding red-throated divers at a stable or increasing trend relative to the reference population. ***and*** Ensure red-throated divers can move safely between the site and important areas of functionally linked land outwith the site.	pairs, representing 15.4% of the GB population (Dillon *et al.* 2009). The national survey (2006) is the most recent survey of breeding red-throated divers in Scotland and indicated that across Scotland as a whole the long-term trend in population size had remained broadly stable since 1983. However, the Shetland population of red-throated divers has declined by around 35-40% over this same time period. The site reference population represents the numbers of breeding pairs within a 10km range of the Bluemull and Colgrave Sounds SPA. This figure does not represent the numbers of red-throated divers that might be anticipated to be foraging within the Bluemull and Colgrave Sounds SPA at any one time but rather the number of breeding pairs that may potentially use parts of the site for foraging during the breeding season. Red-throated divers from the Bluemull and Colgrave Sounds SPA nest and rear their young on inland freshwater lochans outwith the site. The long-term maintenance of the species in the SPA is intrinsically linked to their ability to access and use habitats in areas of functionally linked land outwith the SPA. When assessing the effects of plans or projects consideration should therefore also be given to whether impacts outwith the SPA could affect achievement of this Conservation Objective. Red-throated divers using the Bluemull and Colgrave Sounds SPA will include those breeding at the following SPA: • Otterswick and Graveland SPA Red-throated divers breeding at the Otterswick and Graveland SPA are currently in unfavourable condition but on-site factors are considered to be influencing this.

2b. The distribution of red-throated diver throughout the site is maintained by avoiding significant disturbance of the species.
This objective seeks to ensure that red-throated divers can continue to use and access all areas within the Bluemull and Colgrave Sounds SPA used for feeding, loafing, shelter and other maintenance activities. Changes in the distribution of red-throated divers 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 red-throated divers 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 red-throated divers 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 red-throated divers. It may result in the following types of effect:

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

There are two main ways in which red-throated divers continued access to suitable resources could be restricted and distribution affected and this is where assessments should be focussed:
1. Large scale physical barriers that prevent access and use of the site, or;
2. Disturbance which alters their distribution (displacement) within the site or disrupts important behaviours.

Direct displacement of red-throated divers can arise from: barriers off-site that reduce or prevent movement to and between foraging and roosting locations; and visual disturbance (e.g. associated with vessel movements). Indirect displacement 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)).

Disturbance to foraging red-throated divers may reduce the time spent feeding or cause them to move to different areas that are less energetically profitable. This can place increased energetic demands on breeding birds during an already energetically expensive season.

Red-throated divers are protected throughout the whole site, throughout the year, irrespective of the season for which they are designated.

We anticipate that some locations within the Bluemull and Colgrave Sounds 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 red-throated divers 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 red-throated diver current usage of particular locations within a proposals area of influence, may be required to complete the necessary assessments.

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. Factors limiting the recovery of red-throated divers include the timing, frequency and duration of the activity around vulnerable stages of their life cycle such as during moulting or chick-feeding period.

Site-specific advice	**Site-specific information**
Ensure red-throated divers continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated within the site. ***and*** Avoid significant disturbance to red-throated divers and ensure individuals can move safely between these areas within the site.	Breeding red-throated divers at the Bluemull and Colgrave Sounds SPA commute between freshwater breeding sites, typically at remote lochs or pools, to foraging grounds in adjacent coastal waters within 10km of their nest site (Black *et al.* 2014). The main breeding season for red-throated divers in Scotland extends from May to mid-September, although birds may attend breeding sites from April. Breeding red-throated divers are distributed throughout the Bluemull and Colgrave Sounds SPA when foraging, as this is a single species SPA and the boundary is based on this species' distribution alone. Undisturbed access to productive foraging areas is of particular importance to breeding red-throated divers during the chick-rearing period; the first chicks hatch from early June, with replacement clutches hatching well into July such that chicks may be present from June to mid-September (Hulka, 2010). A breeding pair may make as many as 10-18 foraging trips every 24 hours (Black *et al.* 2014). The largest concentrations of red-throated divers were recorded in shallow and sheltered bays, voes, sea lochs and sounds (Black *et al.* 2014). Dive depths are typically less than 9 m, with a maximum of 21m (McCluskie *et al.* 2012; Robbins, 2017).

2c. The supporting habitats and processes relevant to red-throated diver and their prey/food resources are maintained.

This objective seeks to maintain the current extent, quality and distribution of supporting habitats within the site as well as ensure a sufficient food supply within the site.

Red-throated divers require suitable habitat for foraging, shelter, loafing, and other maintenance activities. The variety, quality, abundance and availability of food resources on which red-throated divers depend is important for ensuring adult fitness, survival and breeding success. The supply of food resources is supported by environmental processes.

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

Maintenance of prey species and their supporting habitats is important to maintain the conditions required to support the red-throated diver 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 population of red-throated divers 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 Bluemull and Colgrave Sounds SPA.

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

There is currently insufficient information to support quantitative advice on the environmental processes associated with the supporting habitats and prey of red-throated divers at the Bluemull and Colgrave Sounds SPA.

Site-specific advice	**Site-specific information**
Maintain the extent and distribution of supporting habitats for red-throated diver within the site. *and* Maintain the variety and abundance of food resources and the condition of supporting	Breeding red-throated divers require suitable habitat within the SPA for foraging. In Scotland, red-throated divers travel within 10km of their inland nest sites at freshwater lochs and pools to feed at sea, with the largest concentrations of foraging birds being recorded within shallow and sheltered bays, voes, sea lochs and sounds (Black *et al*. 2014). Red-throated diver chick diet in Scotland comprises small marine fish, in particular gadoids (including saithe), sandeels (*Ammodytes* species) and clupeids. Adults seize prey with their bill in underwater pursuit, typically diving less than 9m, with a maximum dive depth of around 21m (McCluskie *et al*. 2012; Robbins, 2017). Prey species composition varies among locations, over time and among pairs. There is limited site-specific data on red-throated diver diets within the Bluemull and Colgrave Sounds SPA.

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

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.	The key supporting processes for red-throated divers at the Bluemull and Colgrave Sounds SPA are water quality (nutrients and turbidity), tidal cycles, and water flow. Recent research has found an association between diver abundance and the edges of estuarine frontal zones, particularly during times at high and low tide when they are dominated by slack water (Skov *et al*., 2016). Birds follow the trailing edge of the coastal current and abundance may also be linked to shallow areas, high chlorophyll$_a$ and low sea surface temperature and salinity (Skov & Prins, 2001). In the German Bight, Skov & Prins (2001) did not record any divers in waters with a surface salinity above 34 psu[8], suggesting salinity could also affect their distribution.

[8] Practical Salinity Unit (a measure of the salt concentration in sea water)

Annex 2. Supporting information

Factors determining the potential for feature recovery.

Red-throated diver

Red-throated diver estimated generation length is 8.2 years, with the maximum longevity estimated as around 24 years (Bird *et al.* 2020). Age of first breeding is uncertain, but has been estimated as being 2.5 years (Bird *et al.* 2020). Clutch size is 2 (1-3) eggs (Cramp & Simmons, 2004) and Horswill & Robinson (2015) give national average productivity of 0.571 (±0.222 SD). However, productivity is known to vary depending on region and on the year, from 0.13 (Orkney in 2017) to 0.91 (southern Finland). In past years, Shetland had a mean productivity of 0.45 chicks fledged per breeding pair per year (Gomersall, 1986) but over the past two decades, the number of successful pairs in Shetland has been declining (O'Brien *et al.* 2018). Horswill & Robinson (2015) give an estimated adult (3+years) survival rate of 0.840 (±0.074 SE). Most mortality is thought to occur in the non-breeding season (Schmutz, 2014). Juvenile (0-1year) and immature (1-2 year) survival rates have been estimated as 0.600 and 0.620 (Horswill & Robinson, 2015). As for other species with apparently high adult survival rates, relatively large impacts on population trends may arise from changes to adult survival.

Red-throated divers breeding in Scotland winter over a substantial area including both east and west coasts of Britain and Ireland (Okill, 2002). Birds from breeding grounds in Scandinavia and the Baltic states are thought to migrate mainly to the southern North Sea in winter (Wright *et al*. 2012; O'Brien *et al*. 2008); while birds from Greenland have been recovered in Scotland (Wernham *et al.* 2002). Recent tracking studies of wintering birds captured in the German North Sea indicate that individual birds exhibit high levels of consistency in migration routes, breeding, wintering & moulting areas (Kleinschmidt *et al.* 2017) which may limit individual ability to adapt to changes within wintering areas and hence potential for population recovery from perturbations. Red-throated divers may be particularly sensitive to disturbance during their post-breeding flightless moult period, commencing sometime between late September and December (Cramp & Simmons, 2004).

Pressures at terrestrial nesting grounds (e.g. pollution of inland breeding lakes, depredation by invasive mammalian predators (Furness, 2016) or in wintering areas at sea (e.g. displacement from offshore wind farms) could limit the potential of populations to recover from impacts arising in marine foraging areas.

Annex 3. Glossary for Conservation Objectives and References

Glossary

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.

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