



## 9. Intertidal and Offshore Ornithology

### 9.1. Study Area Definition

This chapter of the Scoping Report describes the potential impacts arising from the construction, operation and maintenance, and decommissioning of the Eastern Green Link 3 (EGL 3) hereafter referred to as 'the Project' on Intertidal and Offshore Ornithology. Intertidal and Offshore Ornithology receptors include species of bird that use the intertidal and offshore area for breeding, foraging and loafing.

The Scoping Boundary for the Project extends from MHWS in England to MHWS in Scotland. It is nominally 1 km wide, 500 m either side of the centreline, but however, it widens in areas where there is still optionality in the design e.g., to allow for micro-routing around potential seabed features. It is anticipated that the Marine Licence application boundary will ultimately be 500 m following refinement and rationalisation as the MEA and design process evolves.

There are two proposed Landfalls in England being considered at this stage of the environmental assessment process; Anderby Creek and Theddlethorpe. These options will be subject to further technical feasibility work and stakeholder consultation and will be refined to one preferred option for inclusion in the subsequent Marine Licence application for the Project.

Kilometre Points (KPs) are used throughout this Chapter to provide context as to where within the Study Area a feature lies. KP 0 is defined at the Anderby Creek Landfall. As there are still alternative Landfalls being considered, KPs have been created along the longest route from the proposed English Landfall at Anderby Creek, around the Holderness Offshore Marine Conservation Zone (MCZ) to the proposed Scottish Landfall at Sandford Bay. The KPs for this route are referenced as KP0 – KP575.3. Alternative options, which branch off this longest route, are routed from the proposed English Landfall at Theddlethorpe to the point where it converges with the longest route (referenced as T\_KP0 to T\_KP18); and through Holderness Offshore MCZ, which is referenced as KP0 to H\_KP40.

The Study Area for the intertidal and offshore ornithology assessment has been defined recognising the highly mobile nature of birds and the distance over which they can range. The extent of the Study Area incorporates the Scoping Boundary plus an additional 15 km either side of the proposed submarine cable corridor. This is a precautionary maximum zone of influence (based on the maximum tidal excursion) that encompasses the potential impact pathway from increased sediment concentrations, which could affect diving birds' ability to seek prey. The Study Area will be reviewed and refined for the marine environmental assessment (MEA) based on maximum tidal excursions and if appropriate sediment dispersion modelling. The zone of influence will be affected by the findings of Chapter 6 – Marine Physical Processes, which should be read in conjunction with this chapter. The Study Area has considered:

- Seabird foraging ranges (Thaxter et al., 2012; Woodward et al., 2019)
- Recent recommendations from statutory nature conservation bodies (SNCBs) regarding maximum disturbance/displacement ranges for sensitive bird species (MIG-Birds, 2022).

According to advice from statutory nature conservation bodies (SNCBs), a maximum buffer of 10 km should be applied to consider red-throated diver (*Gavia stellata*), which are considered to be particularly vulnerable to disturbance (MIG-Birds, 2022), and a buffer of at least 4 km should be applied for other diving birds. The 15 km buffer used to define the Study Area is therefore sufficiently precautionary to cover the potential effects of displacement as well as potential effects resulting from increases in turbidity.

The Study Area for intertidal and offshore ornithology and its relation to the Project is presented in Figure 9-1 (Drawing: C01494-EGL3-BIRD-001) and Figure 9-2 (Drawing: C01494-EGL3-BIRD-002).

### 9.2. Data Sources

Data sourced for the baseline characterisation will be presented in accordance with relevant guidance for the topic. The datasets that will be used to inform the description of the baseline environment for the MEA are described in the following sub-sections.

#### 9.2.1. Site-specific Survey Data

Due to the temporary and transient nature of construction, offshore site-specific bird surveys are not considered necessary for the proposed submarine cable corridor. Although the proposed English and Scottish landfall locations cross a number of designated sites, that support a range of breeding and non-breeding bird species, no intertidal surveys have been planned due to feedback from the onshore team following engagement with SNCB's.



### 9.2.2. Publicly Available Data

A desk-based review of publicly available data sources (literature and GIS mapping files) will be used to describe the baseline environment. Extensive contemporary and historic information is available regarding the ornithological characteristics of the North Sea and will be used in the MEA. Table 9-1 lists the key data sources which will be used in the assessment.

Table 9-1: Key publicly available data sources for intertidal and offshore ornithology

Data Source	Description	Coverage Relative to Study Area	
		English Study Area	Scottish Study Area
Natural England	Natural England Conservation Advice for Marine Protected Areas	✓	
JNCC	JNCC Conservation Advice for Marine Protected Areas	✓	✓
British Trust for Ornithology (BTO) Non-Estuarine Waterbird Surveys (NEWS)	Waterbird Populations: Numbers and Trends by Count Sector.	✓	✓
IUCN	The International Convention for the Conservation of Nature (IUCN) Red List of Threatened Species ( <a href="https://www.iucnredlist.org/">https://www.iucnredlist.org/</a> )	✓	✓
Offshore Energy Strategic Environmental Assessment (SEA) 4 (2022)	Appendix 1 Environmental Baseline, A1a.5 Birds <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061529/Appendix_1a_5_-_Birds.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061529/Appendix_1a_5_-_Birds.pdf</a>	✓	✓
BTO Wetland Bird Survey (WebS)	Annual survey reports of wetland waterbirds.	✓	✓
National Bird Atlas (Balmer et al., 2013)	Results of the five years of breeding season and wintering surveys across the UK at a 10 km resolution.	✓	✓
NatureScot	NatureScots' register for key protected areas across Scotland. Report of the Seasonal Periods for Birds in the Scottish Marine Environment.		✓
Environmental Statements and Scoping reports from Offshore Wind Farm (OWF) Developments. (From MD-LOT Public Register)	<ul style="list-style-type: none"> <li>Outer Dowsing Offshore Wind Preliminary Environmental Information Report Volume 1, Chapter 12: Intertidal and Offshore Ornithology (2023)</li> <li>Hornsea 4 Offshore Wind Farm Environmental Statement, Volume A2, Chapter 5: Offshore and Intertidal Ornithology (2021)</li> <li>Hornsea Offshore Wind Farm Project One Environmental Statement, Volume 5, Chapter 5.5.1 Ornithology Technical Report (2013)</li> <li>Hornsea 3 Offshore Wind Farm Environmental Statement, Volume 2, Chapter 5, Offshore Ornithology (2018)</li> </ul>	✓	✓



Data Source	Description	Coverage Relative to Study Area	
		English Study Area	Scottish Study Area
	<ul style="list-style-type: none"> <li>• Triton Knoll Offshore Wind Farm Final Environmental Assessment Scoping Report (2009)</li> <li>• Morven Offshore Wind Farm Array Project Environmental Impact Assessment Scoping Report (2023)</li> <li>• Ossian Offshore Wind Farm Array Environmental Impact Assessment Scoping Report (2023)</li> </ul>		
Environmental Appraisal Report and Scoping Report for HVDC link projects. National Grid Electricity Transmission and Scottish Hydro Electric Transmission plc.	<ul style="list-style-type: none"> <li>• Eastern Green Link 2 Environmental Appraisal Report (2022)</li> <li>• Scotland to England Green Link (SEGL), Marine Scheme Scoping Report (2021)</li> </ul>	✓	✓

### 9.2.3. Additional Studies

No specific additional studies will be undertaken to inform the baseline characterisation for this receptor. However, the MEA will draw upon the findings of studies undertaken for other topics such as sediment dispersion modelling (see Chapter 6) and sandeel and Atlantic herring habitat assessment (see Chapter 8).

## 9.3. Consultation

Consultation will be undertaken with ornithology stakeholders to supplement the desk-top review and studies. The following bodies will be consulted, as a minimum, to ensure that the most up-to-date information is collated:

*Table 9-2: List of stakeholders to be consulted*

Stakeholder	England	Scotland
Marine Management Organisation (MMO)	✓	
Joint Nature Conservation Committee (JNCC)	✓	✓
Natural England (NE)	✓	
NatureScot		✓
Marine Directorate – Licencing Operations Team (MD-LOT)		✓

## 9.4. Baseline Characterisation

### 9.4.1. Introduction

Intertidal and offshore ornithology refers to the diversity, abundance and function of marine bird species present in the Study Area up to MHWS, at all life stages including feeding, breeding, overwintering and migrating. Marine birds are highly mobile but can be constrained during certain times of the year by factors such as their need to return to a colony to feed and care for chicks, or when they are flightless during a post-breeding moult. Species can also be restricted by their foraging strategy and the availability of prey species and their sensitivity to human activities such as vessel traffic (Atterbury et al., 2021).

For the purposes of this Scoping Report, marine birds have been grouped according to Atterbury et al. (2021) based on their sensitivity and exposure to impacts. Table 9-3 (extracted and adapted from Atterbury et al. 2021) describes the various functional groups.

*Table 9-3: Marine bird groups (adapted from Table 3: Marine Bird in Atterbury et al., 2021 pg.4)*



Function group	Information
Divers, grebes and mergansers	<p><i>“This group includes great northern diver, black-throated diver, red-throated diver, Slavonian grebe, and red-breasted merganser. These species tend to aggregate in coastal waters, and in bays, estuaries and firths. They can aggregate in large numbers in specific areas over the winter, whilst during the breeding season they tend to forage within restricted ranges from their breeding areas. Some of these species have a flightless period following breeding (moulting), during which they may be particularly sensitive to some impacts. They are largely thought to be water column feeders, although there is some evidence that some species may also be benthic feeders (Duckworth et al. 2020 in Atterbury et al. 2021).”</i></p> <p><i>“This group is highly sensitive to noise and visual disturbance, such as from vessel traffic (Fließbach et al. 2019 in Atterbury et al. 2021). Since some of these species may not resettle quickly after being flushed, the vessel transit route plus a buffer of several kilometres may be effectively lost as habitat to some diver and grebe species, with evidence for this being particularly strong for red-throated diver (Mendel et al. 2019 in Atterbury et al. 2021).”</i></p> <p><i>“These species are thought to have some sensitivity to underwater noise and may be impacted by changes in suspended solids when foraging in the water column.”</i></p>
Seaducks, geese and swans	<p><i>“This group includes common eider, goldeneye, scaup, long-tailed duck, common scoter, velvet scoter, whooper swan, Bewick’s swan, greylag goose, barnacle goose, pink-footed goose, dark-bellied brent goose, light-bellied brent goose, shelduck, pintail, pochard, shoveler, wigeon, teal, mallard and gadwall. This category includes species which breed in the UK, migrate through UK waters, and/or winter in the UK. They can use a variety of waters both inshore and offshore. They are benthic, surface or grazing feeders. While some diving sea duck species like eiders and scoters specialise in foraging on shellfish and crustaceans, others such as long-tailed duck, goldeneye and scaup are generalist feeders and their diet can include aquatic plants, polychaetes, amphipods, aquatic insects and some small fish. Other duck, swan and goose species within this group are surface feeders, utilising prey on the surface of intertidal habitats such as the small gastropod mollusc Hydrobia, as well as grazing on saltmarsh and coastal grazing marsh.</i></p> <p><i>Most species within this group are sensitive to visual and noise disturbance from vessel traffic (Fließbach et al. 2019 in Atterbury et al. 2021). In two studies looking at the disturbance effects caused by vessels, common scoters were not observed resettling after being flushed (Schwemmer et al. 2011; Fließbach et al. 2019 both cited in in Atterbury et al. 2021). However, most species in this group, it is not known if or how quickly they recover and move back to areas once a vessel has passed through. It is unknown whether species within this group are sensitive to underwater noise. For species which are benthic feeders, activities that are likely to disturb seabed habitats and species may affect the availability of suitable prey.”</i></p>
Auks	<p><i>“There are four auk species commonly found in waters around the UK: Atlantic puffin, black guillemot, common guillemot and razorbill. They aggregate around the UK in inshore and offshore waters throughout the year. During the breeding season, they tend to form large colonies, and impacts occurring in favoured foraging areas within range of these colonies can have implications for their ability to successfully raise chicks. Adults have a flightless moult period immediately after chicks fledge, which can last several months. When chicks fledge, they too are flightless for several weeks. During these periods adults and chicks may be particularly sensitive to some pressures, including noise and visual disturbance. Auks are water-column feeders, feeding largely on pelagic and demersal fish.</i></p> <p><i>Auks are sensitive to noise and visual disturbance. Vessel transits through important foraging areas or aggregations of these species should be avoided. While there is evidence for underwater anthropogenic noise affecting the foraging behaviour of related species (African penguins; Pichegru et al. 2017 in Atterbury et al. 2021), it remains unclear how sensitive auks are to this impact. As these are species that feed in the water column, they may be affected by changes in water turbidity due to increases in suspended sediments..., which would affect their ability to successfully forage for their prey. In addition, disturbance and loss of seabed habitats can affect availability of suitable prey (e.g., sandeel).”</i></p>
Terns, gulls, kittiwakes and gannets	<p><i>“This group includes common tern, Sandwich tern, Arctic tern, little tern, roseate tern, great black-backed gull, lesser black-backed gull, herring gull, common gull, black-headed gull, Mediterranean gull, little gull, black-legged kittiwakes, petrel species and northern gannet. These species aggregate around the UK in inshore and offshore waters, with terns being present during the spring and autumn migrations and the breeding season, while others can be present in UK waters throughout the year. During the breeding season, they tend to breed in colonies, and impacts occurring in favoured foraging areas within range of these colonies can have implications for their ability to successfully raise chicks. Except for gannets, all species in this group are surface feeders, with some species also feeding in exposed tidal areas. They feed on a wide variety of marine prey including fish, squid, crustaceans, jellyfish and offal.</i></p>



Function group	Information
	<i>These species are low to moderately sensitive to noise and visual disturbance, and some species within this group may be attracted to some vessels, potentially in hope of fishery discards/offal. It is unknown whether species within this group are sensitive to underwater noise. As most species in this group are surface feeders, they may be affected by changes in suspended solids that would affect their ability to successfully forage for their prey (van Kruchten &amp; van der Hammen 2011; Cook &amp; Burton 2010, both cited in Atterbury et al. 2021)."</i>
Waders and harriers	<p><i>"This group includes wader species which breed, migrate and winter along the UK coast. Wader species have various foraging strategies, but all are surface or near-surface feeders, making use of open coast, mud and sandflats, saltmarshes, saline lagoons, rocky coasts (e.g., purple sandpiper, oystercatcher) and nearby grazing marsh and arable land to both feed and roost. Some, such as oystercatcher, are more (but not exclusively) reliant on localised food resources such as cockle and mussel beds whilst others are more generalist. Some species are largely restricted to certain breeding habitats (e.g., avocet: saline lagoons, salt pans and scrapes; ringed plover: sand and shingle, saltmarsh edges) whilst other species utilise a broader range of coastal and adjacent habitats.</i></p> <p><i>This group also includes marsh and hen harrier. Both species can use intertidal habitats extensively in winter for foraging and roosting. Marsh harrier will also utilise coastal habitats in the breeding season and may also breed in saline reedbeds.</i></p> <p><i>This group is sensitive to visual and noise disturbance from vessel traffic. Waders and other species using intertidal habitats are at risk from disturbance caused by people and machinery...across and adjacent to those habitats. In general, there is less risk of disturbance of those habitats from shipping...except where vessels capable of navigating shallow waters are employed. Activities that are likely to disturb their intertidal habitats and prey species may affect the availability of suitable prey for these species."</i></p>

The southern North Sea and the adjacent coastline provide habitats (both breeding and foraging areas) for a wide range of both nationally and internationally recognised marine bird populations. The distribution and abundance of these bird populations fluctuates throughout the year depending on factors such as food availability and seasonality for periods such as breeding.

## 9.4.2. English Baseline

### 9.4.2.1. Overview

The proposed English landfall is within the Greater Wash SPA and crosses a number of other neighbouring designated sites as it approaches the proposed landfalls. The designated sites include a variety of marine habitats of importance for breeding and non-breeding birds, including extensive intertidal mudflats and sandflats, subtidal sandbanks and biogenic reef. Offshore, the proposed submarine cable corridor lies within a shallow area of low salinity which is important for a number of bird species, in particular divers, gulls, seaduck and terns (BEIS, 2022; JNCC, 1995). The area is characterised by extensive sandbank features present at depths of less than 25 m, many of which are protected for their importance in providing habitat and affecting water and sediment dynamics (BEIS, 2022). As discussed above and in Chapter 6 of this Scoping Report, a large proportion of the offshore area in this location is covered by other habitats and species listed under the relevant legislation (SACs).

The recent Offshore Energy Strategic Environmental Assessment (SEA) 4 discusses aspects of the UK baseline environment to facilitate discussion around the potential for future development of renewable energy and oil & gas abstraction. It characterises the UK bird fauna as 'western Palaearctic', meaning that the majority of species are found across western Europe and extend into western Asia and northern Africa.

Digital aerial bird surveys from offshore wind farms in the English Study Area (Outer Dowsing, Hornsea 3 and 4, Triton Knoll) consistently identified the marine birds listed in Table 9-4 as present in the Study Area.

Table 9-4: Marine birds present in the English Study Area

Functional Group	Species
Divers, grebes and mergansers	Red-throated diver, Gannet, Fulmar, Manx Shearwater, Shag
Auks	Puffin, Guillemot, Razorbill, Little auk
Terns, gulls, kittiwakes and gannets	Herring gull, Great black-backed gull, Lesser black-backed gull, Kittiwake, Black-headed gull, Little gull, Common gull, Sandwich tern, Common tern, Artic tern, Artic skua, Great skua
Seaducks, geese and swans	Common scoter
Waders and harriers	Curllew, Lapwing, Oystercatcher



#### 9.4.2.2. Designated Sites England

The intertidal and offshore areas in England along the proposed submarine cable corridor are extensively covered by designated sites for the protection of bird species and their habitats, including SPAs, proposed SPAs (pSPAs), Ramsar sites, SSSIs and NNRs. These sites are illustrated in Figure 9-1 (C01494-EGL3-BIRD-001). The following section identifies the designated features for these sites, as these are the species which are most likely to be seen within the Study Area and are considered the most relevant sensitive receptors for the purposes of characterising the environment. However, it should be noted that other bird species may be encountered within the Study Area.

There are several bird species known to be reliant on the intertidal habitats of the east coast that lie in the vicinity of the proposed landfalls and the nearshore parts of the proposed submarine cable corridor. The intertidal environment of the Lincolnshire coast is characterised by shifting, sandy beaches, sand dunes and soft cliffs, and it is actively eroding. The Humber Estuary and The Wash are the northern and southern boundaries of the Lincolnshire coast, respectively. Intertidal areas of both the Wash and Humber are important habitat for wading birds. However, the distribution and abundance of seabirds in the area varies throughout the year depending on factors such as food availability and seasonality for periods such as breeding. These are summarised in Table 9-4 below, along with the bird species which have been identified as protected features. The English landfalls overlap the Greater Wash SPA which has offshore ornithological designations for breeding terns and overwintering red-throated diver (*Gavia stellata*) and common scoter (*Melanitta nigra*).

Table 9-5 presents the designated sites that are designated for ornithology identified using publicly available GIS data (JNCC, 2022). The Project passes through the Greater Wash SPA for approximately 35.7 km. It also passes through the Holderness Offshore Marine Conservation Zone (MCZ), which is designated for subtidal habitats and species that support bird populations within the estuary and Southern North Sea Special Area of Conservation (SAC), which is an area of importance for harbour porpoise.

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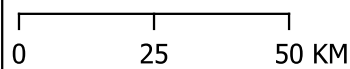
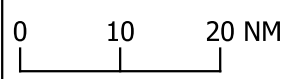


# Intertidal and Offshore Ornithology Including Designated Sites in England

**C01494-EGL3-BIRD-001-C**



- Exclusive Economic Zone Limit (EEZ)
- Scottish Adjacent Waters
- 12NM Limit
- EGL 3 Scoping Boundary
- 15km Study Area
- Designated Sites**
- ▨ Special Protection Area (SPA)
- National Nature Reserve (NNR)
- Site of Special Scientific Interest (SSSI)
- RAMSAR Site



<b>Date</b>	19/10/2023
<b>Coordinate System</b>	ETRS89 / UTM Zone 30N
<b>Projection</b>	Universal Transverse Mercator (UTM)
<b>Unit</b>	Meters
<b>Scale at A3</b>	1:1,400,000
<b>Created</b>	EP
<b>Reviewed</b>	MH/SP
<b>Authorised</b>	AF

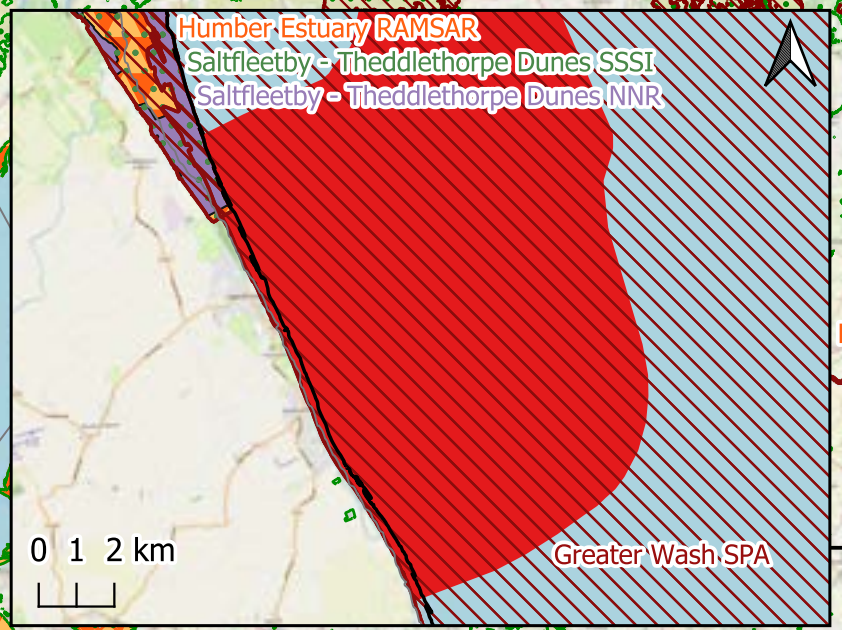
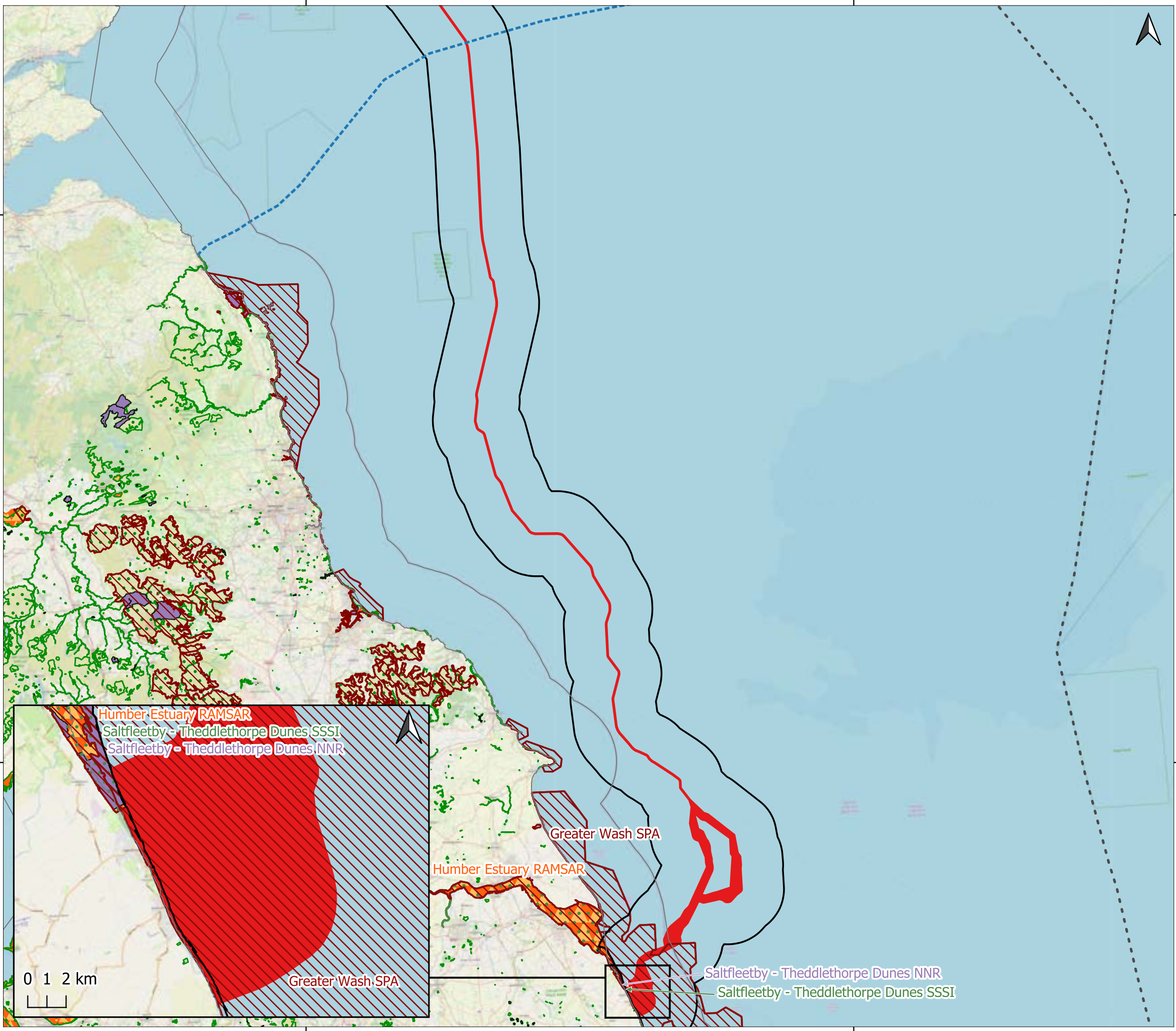




Table 9-5: Designated sites within proximity of the English Study Area

Note: non marine birds are in light grey.

Designated site	Distance from Scoping Boundary (km)	Site description	Protected feature
Humber Estuary SPA	Overlaps for 0.34 km	The Humber Estuary is located on the east coast of England and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern <i>Botaurus stellaris</i> , marsh harrier ( <i>Circus aeruginosus</i> ), avocet ( <i>Recurvirostra avosetta</i> ) and little tern ( <i>Sterna albifrons</i> ) (Natural England, 2014). The SPA covers an area of 37,630.24 ha and qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season.	<p><b>Breeding</b></p> <p>Avocet (<i>Recurvirostra avosetta</i>)                      Bittern (<i>Botaurus stellaris</i>)                      Little tern (<i>Sterna albifrons</i>)                      Marsh Harrier (<i>Circus aeruginosus</i>)</p> <p><b>Non-breeding</b></p> <p>Avocet (<i>Recurvirostra avosetta</i>)                      Bar-tailed godwit (<i>Limosa lapponica</i>)                      Bittern (<i>Botaurus stellaris</i>)                      Black-tailed godwit (<i>Limosa limosa islandica</i>)                      Dunlin, <i>Calidris (alpina alpina)</i>                      Golden plover (<i>Pluvialis apricaria</i>)                      Hen harrier (<i>Circus cyaneus</i>)                      Knot, <i>Calidris (canutus)</i>                      Redshank (<i>Tringa tetanus</i>)                      Ruff (<i>Calidris pugnax</i>)                      Shelduck (<i>Tadorna tadorna</i>)                      Waterbird assemblage</p>
Greater Wash SPA	Overlaps for 35.7 km	The Greater Wash SPA lies along the east coast of England, predominantly in the coastal waters of the mid-southern North Sea between the counties of Yorkshire to the north and Suffolk to the south. It covers an area of c. 3,536 km <sup>2</sup> and supports the largest breeding populations of little terns within the UK SPA network by protecting important foraging areas. It also supports the second largest aggregation of non-breeding red-throated diver and little gull (JNCC, 2018). The area of the SPA includes a range of marine habitats, including intertidal mudflats and sandflats, subtidal sandbanks and biogenic reef, including <i>Sabellaria</i> reefs and mussel beds. Much of the area is less than 30 m water depth, with a deep channel of 90 m depth at the Wash approaches.	<p><b>Breeding</b></p> <p>Little tern (<i>Sterna albifrons</i>)                      Sandwich tern (<i>Thalasseus sandvicensis</i>)</p> <p><b>Non-breeding</b></p> <p>Common scoter (<i>Melanitta nigra</i>)                      Common tern (<i>Sterna hirundo</i>)                      Little gull (<i>Hydrocoloeus (Larus) minutus</i>)                      Red-throated diver (<i>Gavia stellata</i>)</p>
Humber Estuary Ramsar	Overlaps for 0.34 km	The Humber Estuary RAMSAR site is 379.88 km <sup>2</sup> . It drains a catchment of some 24,240 km <sup>2</sup> and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. Vegetation includes extensive reedbeds, areas of mature and developing saltmarsh, backed by grazing marsh or low sand dunes with marshy slacks and brackish pools. The area regularly supports internationally important numbers of various species of breeding and wintering waterbirds. Many passage birds, notably internationally important populations of ringed plover ( <i>Charadrius hiaticula</i> ), and sanderling ( <i>Calidris alba</i> ) stage in the area. The site supports Britain's most southeasterly breeding colony of grey seal ( <i>Halichoerus grypus</i> ). Human activities include tourism, recreation, commercial and recreational fishing, livestock grazing, and hunting (RAMSAR, 2023).	<p><b>Wintering and Passage</b></p> <p>Bar-tailed godwit (<i>Limosa lapponica</i>)                      Black-tailed godwit (<i>Limosa limosa</i>)                      Dunlin (<i>Calidris alpina</i>)                      Golden plover (<i>Pluvialis apricaria</i>)                      Knot (<i>Calidris canutus</i>)                      Redshank (<i>Tringa tetanus</i>)</p> <p><b>Wintering</b></p> <p>Shelduck (<i>Tadorna tadorna</i>)                      Waterbird assemblage</p>
Humber Estuary SSSI	4.3 km	The Humber Estuary SSSI is 108.66 km <sup>2</sup> and goes from Grimbsy Dock to Humber Mouth Subtidal. The current condition of the site has been classed as unfavourable – recovering condition, with a section between Humberston and Louth Canal of favourable condition along the coast. Another favourable section off the coast which forms the Donna Nook National Nature Reserve (Natural England, 2010).	<p><b>Non-Breeding</b></p> <p>Avocet (<i>Recurvirostra avosetta</i>)                      Bar-tailed godwit (<i>Limosa lapponica</i>)                      Bittern (<i>Botaurus stellaris</i>)                      Dark-bellied brent goose (<i>Branta bernicla bernicla</i>)                      Curlew (<i>Numenius arquata</i>)                      Dunlin (<i>Calidris alpina</i>)</p>





Designated site	Distance from Scoping Boundary (km)	Site description	Protected feature
		<p>The site supports nationally important numbers of 22 wintering waterfowl and nine passage waders, and a nationally important assemblage of breeding birds along the lowland open waters. Wintering waterfowl and passage waders are widely distributed throughout the estuary. The distribution of species reflects the varying habitats and species ecology across the site. The sandy sediments of the outer estuary are populated by assemblages of knot and grey plover, while the upper estuary is characterised by large concentrations of wigeon.</p> <p>The Humber Estuary also supports a breeding bird assemblage across the open waters in the lowlands, including nationally important numbers of bittern, marsh harrier, avocet and bearded tit. Breeding avocets were first recorded at the site in 1992 and in recent years numbers of the species have sustainably increased. The majority of the assemblage are found in concentrations within the lagoons, clay pits and reedbeds at Far Ings (Natural England, 2023).</p>	<p>Golden plover (<i>Pluvialis apricaria</i>)                      Goldeneye (<i>Bucephala clangula</i>)                      Greenshank (<i>Tringa nebularia</i>)                      Grey plover (<i>Pluvialis squatarola</i>)                      Knot (<i>Calidris canutus</i>)                      Lapwing (<i>Vanellus vanellus</i>)                      Oystercatcher (<i>Haematopus ostralegus</i>)                      Pochard (<i>Aythya farina</i>)                      Redshank (<i>Tringa tetanus</i>)                      Ringed plover (<i>Charadrius hiaticula</i>)                      Ruff (<i>Philomachus pugnax</i>)                      Sanderling (<i>Calidris alba</i>)                      Shelduck (<i>Tadorna tadorna</i>)                      Wigeon (<i>Anas Penelope</i>)                      Teal (<i>Anas crecca</i>)                      Scaup (<i>Aythya marila</i>)                      Turnstone (<i>Arenaria interpres</i>)                      Whimbrel (<i>Numenius phaeopus</i>)</p> <p>Breeding bird assemblages</p>
Saltfleetby – Theddlethorpe Dunes SSSI	Overlaps for 0.34 km	<p>The Saltfleetby to Theddlethorpe Dunes SSSI is a nationally important site which comprises of salt and freshwater marshes, flats and dunes. These habitats support a variety of rich flora and fauna. There are outstanding assemblages of invertebrates, vascular plants and breeding birds, and it is the most north-easterly breeding site in the UK for the Natterjack Toad.</p> <p>The extensive intertidal sands and mudflats provide perfect grounds for feeding and roosting waterfowl and waders including shelduck, dunlin and brent geese. Saltmarsh communities in succession dominate the area and attract yellow wagtails which breed on the marsh and a small colony of little tern on the shingle bank (Natural England, 1981).</p>	<p><b>Breeding</b>                      Little Tern (<i>Sterna albifrons</i>)</p> <p><b>Non-Breeding</b>                      Dark-bellied brent Goose (<i>Branta bernicla bernicla</i>)                      Dunlin (<i>Calidris alpina alpina</i>)                      Knot (<i>Calidris canutus</i>)                      Redshank (<i>Tringa tetanus</i>)                      Sanderling (<i>Calidris alba</i>)                      Wigeon (<i>Anas Penelope</i>)</p> <p>No-breeding waterbirds</p>
Saltfleetby – Theddlethorpe Dunes NNR	Overlaps for 0.34 km	<p>The Saltfleetby – Theddlethorpe Dunes NNR is an important reserve which contains tidal sands and mudflats, salt and freshwater marshes and sand dunes. The site spans over 951 hectares. On the foreshore, accreting mud and silt flats and saltmarsh in the north give way to a narrower sandy beach at the southern end. The sand dunes are also much wider in the north and there is an extensive freshwater marsh between two dune ridges, which converge into a narrower ridge south of Churchill Lane at Theddlethorpe (Lincs Wildlife Trust, 2023).</p>	<p><b>Breeding</b>                      Little Tern (<i>Sterna albifrons</i>)</p> <p><b>Non-Breeding</b>                      Dark-bellied brent Goose (<i>Branta bernicla bernicla</i>)                      Dunlin (<i>Calidris alpina alpina</i>)                      Knot (<i>Calidris canutus</i>)                      Redshank (<i>Tringa tetanus</i>)                      Sanderling (<i>Calidris alba</i>)                      Wigeon (<i>Anas Penelope</i>)</p> <p>Non-breeding waterbirds</p>

#### 9.4.2.3. Species Seasonality England

There are three regular patterns of species occurrence in the UK: resident, summer visitors (breeding) and winter visitors (non-breeding) (BEIS, 2022). Table 9-6 provides information on the seasonality of each species listed as a qualifying feature of the designated sites in England identified above. Information on seasonality has been recorded from Natural England’s Designated Sites view Site Search (naturalengland.org.uk) and the Humber Estuary Low Tide Programme (2013). Where seasonality between sites differs all months where species presence is noted has been identified. Species seasonality has only been considered for marine birds. Species not considered to be marine birds including lapwing (*Vanellus vanellus*), hen harrier (*Circus cyaneus*), bittern (*Botaurus stellaris*) and marsh harrier (*Circus aeruginosus*) have not been included in the seasonality table.



Table 9-6: Species seasonality for designated sites

Protected species	Site	Sensitivity	Seasonality											
			J	F	M	A	M	J	J	A	S	O	N	D
Avocet ( <i>Recurvirostra avosetta</i> )	Humber Estuary SPA	Breeding												
Avocet ( <i>Recurvirostra avosetta</i> )	Humber Estuary SPA	Non-breeding												
Bar-tailed godwit ( <i>Limosa lapponica</i> )	Humber Estuary SPA, Ramsar and SSSI	Non-breeding												
Bittern ( <i>Botaurus stellaris</i> )	Humber Estuary SPA and SSSI	Non-breeding												
Black-tailed godwit ( <i>Limosa limosa islandica</i> )	Humber Estuary SPA and Ramsar	Non-breeding												
Common scoter ( <i>Melanitta nigra</i> )	Greater Wash SPA	Non-breeding												
Common tern ( <i>Sterna hirundo</i> )	Greater Wash SPA	Breeding												
Curlew ( <i>Numenius arquata</i> )	Humber Estuary SSSI	Non-breeding												
Dark-bellied brent Goose ( <i>Branta bernicla bernicla</i> )	Saltfleetby – Theddlethorpe Dunes SSSI and NNR, Humber Estuary SSSI	Non-breeding												
Dunlin ( <i>Calidris alpina alpina</i> )	Humber Estuary SPA, Ramsar and SSSI, Saltfleetby – Theddlethorpe Dunes SSSI and NNR	Non-breeding												
Golden plover ( <i>Pluvialis apricaria</i> )	Humber Estuary SPA, Ramsar and SSSI	Non-breeding												
Goldeneye ( <i>Bucephala clangula</i> )	Humber Estuary SSSI	Non-breeding												
Greenshank ( <i>Tringa nebularia</i> )	Humber Estuary SSSI	Non-breeding												
Grey plover ( <i>Pluvialis squatarola</i> )	Humber Estuary SSSI	Non-breeding												
Knot ( <i>Calidris canutus</i> )	Humber Estuary SPA, Ramsar and SSSI, Saltfleetby – Theddlethorpe Dunes NNR	Non-breeding												
Little gull, ( <i>Hydrocoloeus (Larus) minutus</i> )	Greater Wash SPA	Non-breeding												
Little tern ( <i>Sterna albifrons</i> )	Humber Estuary SPA, Greater Wash SPA, Humber Estuary SPA, Saltfleetby – Theddlethorpe Dunes SSSI and NNR	Breeding												
Oystercatcher ( <i>Haematopus ostralegus</i> )	Humber Estuary SSSI	Non-breeding												
Pochard ( <i>Aythya farina</i> )	Humber Estuary SSSI	Non-breeding												
Redshank ( <i>Tringa tetanus</i> )	Humber Estuary SPA, Ramsar and SSSI, Saltfleetby – Theddlethorpe Dunes SSSI and NNR	Non-breeding												
Ringed plover ( <i>Charadrius hiaticula</i> )	Humber Estuary SSSI	Non-breeding												
Ruff ( <i>Calidris pugnax</i> )	Humber Estuary SPA and SSSI	Non-breeding												
Red-throated diver ( <i>Gavia stellata</i> )	Greater Wash SPA	Non-breeding												



Protected species	Site	Sensitivity	Seasonality													
			J	F	M	A	M	J	J	A	S	O	N	D		
Sanderling ( <i>Calidris alba</i> )	Saltfleetby – Theddlethorpe Dunes SSSI and NNR, Humber Estuary SSSI	Non-breeding														
Sandwich tern ( <i>Thalasseus sandvicensis</i> )	Greater Wash SPA	Breeding														
Shelduck ( <i>Tadorna tadorna</i> )	Humber Estuary SPA, Ramsar and SSSI	Non-breeding														
Scaup ( <i>Aythya marila</i> )	Humber Estuary SSSI	Non-breeding														
Turnstone ( <i>Arenaria interpres</i> )	Humber Estuary SSSI	Non-breeding														
Teal ( <i>Anas crecca</i> )	Humber Estuary SSSI	Non-breeding														
Wigeon ( <i>Anas Penelope</i> )	Saltfleetby – Theddlethorpe Dunes SSSI and NNR, Humber Estuary SSSI	Non-breeding														
Whimbrel ( <i>Numenius phaeopus</i> )	Humber Estuary SSSI	Non-breeding														

<b>Key</b>	Annex I Species		Non-Annex I Species	
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### 9.4.3. Scottish Baseline

#### 9.4.3.1. Overview

The proposed Scottish landfall is within the Buchan Ness to Collieston Coast SPA. There are a number of other neighbouring designated sites in close proximity to the Scottish Study Area. The Buchan Ness to Collieston Coast SPA includes a variety of marine habitats that supports breeding bird populations. The area is characterised by varied coastal vegetation on the ledges and the cliff tops includes maritime heath, grassland and brackish flushes (NatureScot, 2009). There are regional digital aerial bird surveys for offshore wind farms in the Scottish Study Area (Morven and Ossian) that consistently identified the marine birds listed in Table 9-7 as present in the Study Area.

During the breeding season, the sea in the southeast of Scotland is internationally important for at least thirteen breeding bird species, namely northern gannet (*Morus bassanus*), Manx shearwater (*Puffinus puffinus*), cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*), herring gull (*Larus argentatus*), lesser black-backed gull (*Larus fuscus*), black-legged kittiwake (*Rissa tridactyla*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), Sandwich tern (*Sterna sandvicensis*), common guillemot (*Uria aalge*), razorbill (*Alca torda*) and Atlantic puffin (*Fratercula arctica*) (JNCC, 1997; NatureScot, 2020).

Table 9-7 Marine birds present in the Scottish Study Area

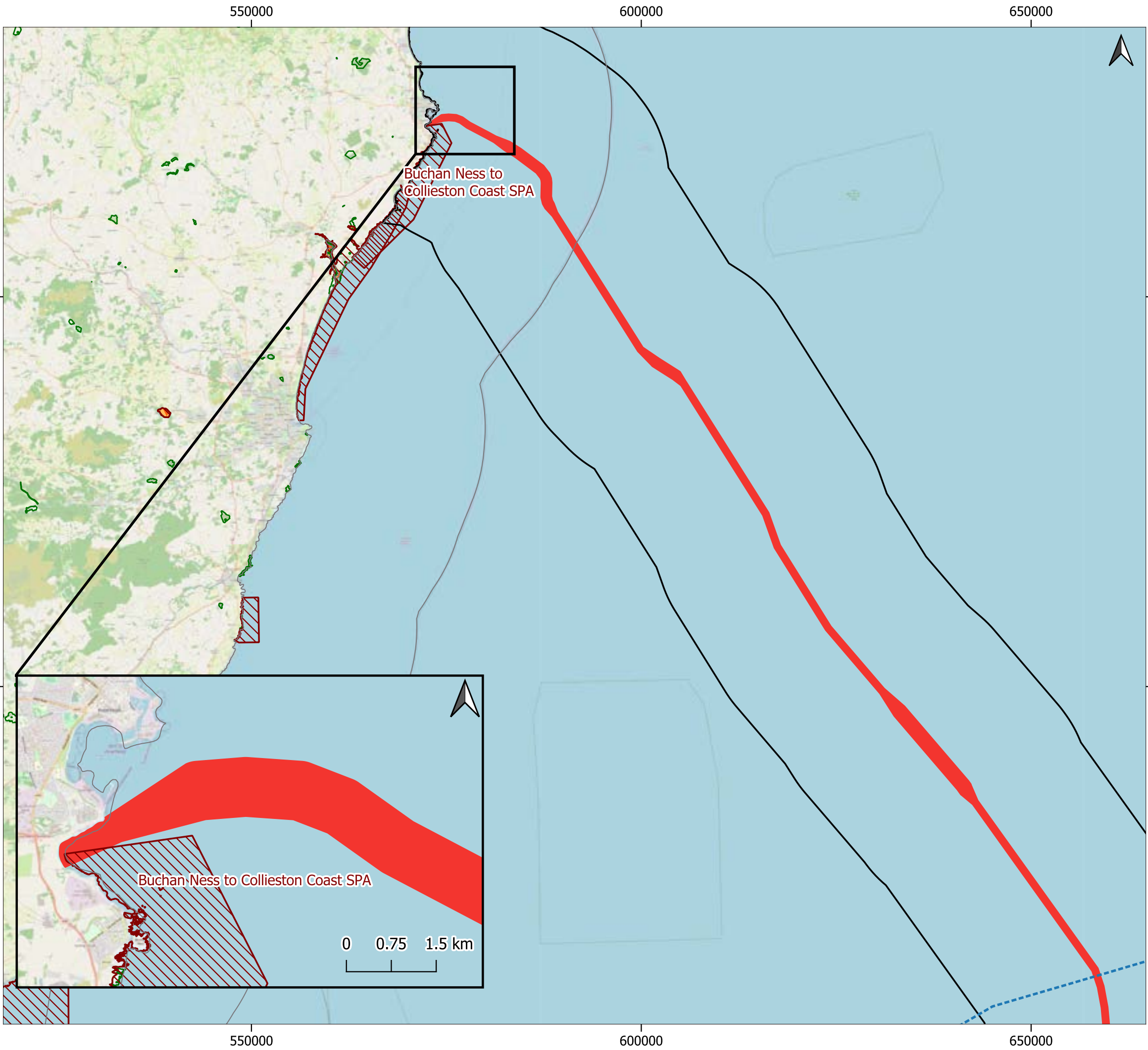
Functional Group	Species
Divers, grebes and mergansers	Red-throated diver, Northern gannet, Northern fulmar, Manx Shearwater, Sooty shearwater
Auks	Puffin, Common guillemot, Razorbill, Black guillemot, Little auk
Terns, gulls, kittiwakes and gannets	Herring gull, Great black-backed gull, Lesser black-backed gull, Black-legged kittiwake, Black-headed gull, Little gull, Common gull, Sandwich tern, Common tern, Arctic tern, Arctic skua, Great skua
Seaducks, geese and swans	Wigeon

#### 9.4.3.2. Designated Sites Scotland

The intertidal and offshore areas in Scotland along the proposed submarine cable corridor are extensively covered by designated sites for the protection of bird species and their habitats, including SPAs, Ramsar sites and SSSIs. These sites are illustrated in Figure 9-2 (C01494-EGL3-BIRD-002). The following section identifies the designated features for these sites, as these are the species which are most likely to be seen within the Study Area and are considered the most relevant sensitive receptors for the purposes of characterising the receiving environment. However, it should be noted that other bird species may be encountered within the Project.



Table 9-8 presents the designated sites that are designated for ornithology identified using publicly available GIS data (JNCC, 2022). The Project potentially passes through the Buchan Ness to Collieston Coast SPA for 0.69 km at the Scottish Landfall. However, the designated site can be avoided via Horizontal Directional Drilling (HDD) beneath the sites or micro-routing.

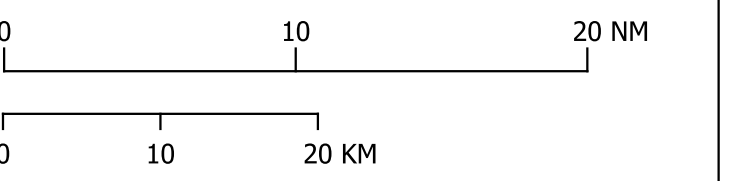


**Intertidal and Offshore Ornithology Including Designated Sites in Scotland**

**C01494-EGL3-BIRD-002-C**



- - - Exclusive Economic Zone Limit (EEZ)
- - - Scottish Adjacent Waters
- 12NM Limit
- █ EGL 3 Scoping Boundary
- 15km Study Area
- Designated Sites**
- ▨ Special Protection Area (SPA)
- ⋯ Site of Special Scientific Interest (SSSI)
- ▨ RAMSAR Site



<b>Date</b>	25/10/2023
<b>Coordinate System</b>	ETRS89 / UTM Zone 30N
<b>Projection</b>	Universal Transverse Mercator (UTM)
<b>Unit</b>	Meters
<b>Scale at A3</b>	1:480,000
<b>Created</b>	EP
<b>Reviewed</b>	MH/SP
<b>Authorised</b>	AF

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Table 9-8: Designated sites within proximity of the Scottish Study Area

Designated site	Distance from Scoping Boundary (km)	Site description	Protected feature
Buchan Ness to Collieston Coast SPA	Overlaps for 0.69 km	Buchan Ness to Collieston Coast SPA is a stretch of south-east facing cliff in Aberdeenshire, Scotland. The 15 km stretch of cliffs, formed of granite, quartzite and other rocks, runs south of Peterhead, broken only by the sandy beach of Cruden Bay. The varied coastal vegetation on the ledges and the cliff tops includes maritime heath, grassland and brackish flushes (NatureScot, 2009). The boundary of the SPA follows the boundaries of Bullers of Buchan Coast SSSI and Collieston to Whinniford Coast SSSI, and the seaward extension extends approximately 2 km into the marine environment to include the seabed, water column and surface. Buchan Ness to Collieston Coast SPA qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual seabirds. It regularly supports 95,000 seabirds including nationally important populations of marine birds.	<b>Breeding</b> Fulmar ( <i>Fulmarus glacialis</i> ) Guillemot ( <i>Uria aalge</i> ) Herring gull ( <i>Larus argentatus</i> ) Kittiwake ( <i>Rissa tridactyla</i> ) Shag ( <i>Phalacrocorax aristotelis</i> ) Seabird assemblage
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	8.1 km	Ythan Estuary, Sands of Forvie and Meikle Loch SPA covers a complex area in the northeast of Scotland that contains the long, narrow estuary of the River Ythan, the Sands of Forvie on the east bank of the estuary; the eutrophic Meikle Loch and a marine component covering the area between Aberdeen and Cruden Bay to the north. The area covers an area of 70.62 km <sup>2</sup> . The boundaries of the SPA follow those of Sands of Forvie and Ythan Estuary SSSI and the shore of Meikle Loch and Little Loch within Meikle Loch and Kippet Hills SSSI (NatureScot, 2020). The SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: Sandwich tern (1989 to 1991, up to 1125 pairs, up to 7% of the GB population); common tern (1989 to 1993, up to 265 pairs, up to 2% of the GB population); and little tern (1989 to 1993, up to 41 pairs, up to 2% of the GB population). The marine component, immediately offshore of the terrestrial area forms the foraging zone for both Sandwich terns and little terns.	<b>Breeding</b> Sandwich tern ( <i>Sterna sandvicensis</i> ) Common tern ( <i>Sterna hirundo</i> ) Little tern ( <i>Sterna albifrons</i> )  <b>Non-Breeding</b> Common eider ( <i>Somateria mollissima mollissima</i> ) Lapwing ( <i>Vanellus vanellus</i> ) Pink-footed goose ( <i>Anser brachyrhynchus</i> ) Redshank ( <i>Tringa tetanus</i> ) Non-breeding waterfowl assemblage
Loch of Strathbeg SPA	13.7 km	Loch of Strathbeg SPA covers a complex area 616.26 hectares that is composed of a shallow freshwater loch with surrounding wetland grassland and dunes communities. The area provides a valuable wintering habitat for a number of important wetland bird species, in particular wildfowl. The boundaries of the SPA are contained within the Loch of Strathbeg SSSI. Loch of Strathbeg SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: sandwich tern (1985 to 1990 an average of 280 pairs, 2.0% of the GB population); whooper swan (a 5-year winter peak mean between 1986/87 and 1990/91 of 245 individuals, 4% of the GB population) and Svalbard barnacle goose (a 5-year winter peak mean between 2005/06 and 2009/10 of 520 individuals, 1.6% of the GB population). The SPA further qualifies under Article 4.2 by supporting populations of European importance migratory species including pink-footed goose and greylag goose and an excess of 20,000 individual waterfowl (Natural England, 2018).	<b>Breeding</b> Sandwich tern ( <i>Sterna sandvicensis</i> )  <b>Non-Breeding</b> Whooper swan ( <i>Cygnus cygnus</i> ) Svalbard barnacle goose ( <i>Branta leucopsis</i> ) Pink-footed goose ( <i>Anser brachyrhynchus</i> ) Greylag goose ( <i>Anser anser</i> ) Teal ( <i>Anas crecca</i> ) Goldeneye ( <i>Bucephala clangula</i> ) Non-breeding waterfowl assemblage
Loch of Strathbeg Ramsar	13.7 km	Loch of Strathbeg Ramsar is composed of a dune slack pool with surrounding wetland habitats, dune and grassland communities. The site provides wintering and breeding habitat for a number of important wetland bird species, in particular wildfowl and is also an important passage area for migratory wildfowl from Scandinavia and Iceland/Greenland. The plant communities are highly diverse and support a wide range of invertebrate fauna (RIS, 2006).  The site qualifies under Ramsar Criterion 1 by containing the largest dune slack pool in GB (200 hectares) and the largest water body in the north-east Scottish Lowlands. Further the site	<b>Breeding</b> Sandwich tern ( <i>Sterna sandvicensis</i> )  <b>Non-Breeding</b> Goldeneye ( <i>Bucephala clangula</i> ) Greylag goose ( <i>Anser anser</i> ) Pink-footed goose ( <i>Anser brachyrhynchus</i> ) Svalbard barnacle goose ( <i>Branta leucopsis</i> ) Whooper swan ( <i>Cygnus cygnus</i> )



Designated site	Distance from Scoping Boundary (km)	Site description	Protected feature
		qualifies under Ramsar Criterion 2 by supporting Sandwich tern (1985 to 1990, an average of 280 pairs, 2.0% of the GB population) (RAMSAR, 2022).	Teal ( <i>Anas crecca</i> ) Non-breeding waterfowl assemblage
Bullers to Buchan Coast SSSI	1.8 km	<p>The Bullers of Buchan Coast SSSI site comprises the sea cliffs and coastal strip from Buchan Ness, near Peterhead, southwards to just beyond Slains Castle, near Cruden Bay, including the Bullers of Buchan. The cliffs, slopes and inshore stacks are of special geological and biological interest. (NatureScot, 2010). The sea-cliffs and slopes support a wide range of maritime habitats including grassland, crevice and ledge communities with characteristic species such as thrift (<i>Armeria maritima</i>), Scots lovage (<i>Ligusticum scoticum</i>) and roseroot (<i>Sedum rosea</i>). The cliff top has some of the best examples of heath and brackish flushes on the coast of north-east Scotland.</p> <p>The sea-cliffs and inshore stacks support a colony of breeding seabirds which is of international importance. This assemblage includes nationally important populations of kittiwake and guillemot. Shag, herring gull, fulmar, razorbill, and puffin are also present.</p>	<p><b>Breeding</b></p> <p>Guillemot (<i>Uria aalge</i>) Kittiwake (<i>Rissa tridactyla</i>) Shag (<i>Phalacrocorax aristotelis</i>) Breeding seabird colony</p>
Collieston to Whinnyfold Coast SSSI	10.5 km	<p>Collieston to Whinnyfold Coast SSSI is a narrow site which comprises of sea cliffs up to 40 m high, steeply sloping grassland and one small area of beach. Several headlands within the site support one of the largest sea bird colonies in Grampian. When considered in conjunction with the seabird colonies of the neighbouring Bullers of Buchan SSSI as part of the Buchan Ness to Collieston SPA, the breeding population of kittiwake in particular, contribute to internationally important numbers of this species. The species-rich grasslands and flushes of the cliff tops together with the vegetation on the cliff faces and ledges are also of special interest.</p> <p>Site condition monitoring of the bird features was last carried out in 2007. Between 2001 and 2007 guillemot numbers had increased by 11% in the SSSI but had declined by 34% in the SPA, though still 12% greater than the 1995 baseline for the SPA. Hence guillemot was assessed as Favourable, maintained and Favourable, declining for the SSSI and SPA respectively (SNH, 2011).</p> <p>Fulmar was assessed as in unfavourable condition due to a 56% decline from the baseline population. Numbers of guillemots were 34% lower than in 1995, which was a concern, but did not warrant unfavourable status. The trend for falling seabird numbers is consistent with national trends, thought to be linked to changes in food supply outside the designated site (SNH, 2011).</p>	<p><b>Breeding</b></p> <p>Fulmar (<i>Fulmarus glacialis</i>) Guillemot (<i>Uria aalge</i>) Kittiwake (<i>Rissa tridactyla</i>) Razorbill (<i>Alca torda</i>) Breeding seabird colony</p>
Loch of Strathbeg SSSI	12.3 km	<p>Loch of Strathbeg SSSI is located on the north-east and is a key geomorphological site for its extensive and dynamic dune system. The site is of importance for passage and wintering waterfowl. The number of whooper swan and greylag and pink-footed geese are of international importance. These species represent 1% of Icelandic, 6% of Icelandic and 25% of total Icelandic/Greenlandic populations respectively (NatureScot, 2011). During the breeding the loch and surrounding areas support a diverse bird community including teal, redshank, tufted duck and water rail.</p> <p>The site contains the largest dune slack loch in Britain – an especially good example of a naturally shallow eutrophic lake with an unusual biology and water chemistry. Surrounding the loch is an extensive area of reed beds, freshwater marshes, and willow and alder carr containing a rich but rare flora and fauna including flat-stalked pondweed (<i>Potamogeton friesii</i>), Slender-</p>	<p><b>Non-Breeding</b></p> <p>Greylag goose (<i>Anser anser</i>) Goldeneye (<i>Bucephala clangula</i>) Pink-footed goose (<i>Anser brachyrhynchus</i>) Whooper swan (<i>Cygnus cygnus</i>)</p> <p>Breeding bird assemblage</p>



Designated site	Distance from Scoping Boundary (km)	Site description	Protected feature
		leaved pondweed ( <i>Potamogeton filiformis</i> ) and creeping spearwort ( <i>Ranunculus reptans</i> ) (SNH, 2011a)	
Meikle Loch and Kippet Hills SSSI	14.5 km	Meikle Loch and Kippet Hills SSSI cover an area of 71.95 hectares and is a site of interest for studies of Quaternary geomorphology and stratigraphy in north-east Scotland. The fine assemblage of features comprises a 3 km long esker ridge and other ice-contact glaciofluvial landforms, including the kettlehole occupied by Meikle Loch. The small loch is eutrophic with little aquatic vegetation. However, the loch is of European importance for both Pink-footed geese and Greylag geese. Meikle loch is one of the major roosts for a large population of pink-footed geese that are found in the Grampian lowlands from autumn to spring. Between 15 and 20% of the NW European/world population of pink-footed geese regularly use the loch (SNH, 2011b).  Other waterfowl occur at the site in smaller number on passage and over winter including teal, tufted duck, wigeon and pochard.	<b>Non-Breeding</b> Greylag goose ( <i>Anser anser</i> ) Pink-footed goose ( <i>Anser brachyrhynchus</i> )

#### 9.4.3.3. Species Seasonality Scotland

There are three regular patterns of species occurrence in the UK: resident, summer visitors (breeding) and winter visitors (non-breeding) (BEIS, 2022). Table 9-9 provides information on the seasonality of each species listed as a qualifying feature of the designated sites in Scotland identified above. Information on seasonality has been recorded from NatureScot's SiteLink Search (<https://sitelink.nature.scot/home>) and NatureScot short guidance note (2020a). Where seasonality between sites differs, all months where species presence is noted has been identified. Species seasonality has only been considered for marine birds. Species not considered to be marine birds including lapwing (*Vanellus vanellus*) have not been included in the seasonality table.

Table 9-9: Species seasonality for designated sites

Protected species	Site	Sensitivity	Seasonality													
			J	F	M	A	M	J	J	A	S	O	N	D		
Common eider ( <i>Somateria mollissima mollissima</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Non-breeding														
Common tern ( <i>Sterna hirundo</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Breeding														
Fulmar ( <i>Fulmarus glacialis</i> )	Buchan Ness to Collieston Coast SPA, Collieston to Whinnyfold Coast SSSI	Breeding														
Goldeneye ( <i>Bucephala clangula</i> )	Loch of Strathbeg SPA, SSSI and Ramsar	Non-breeding														
Greylag goose ( <i>Anser anser</i> )	Loch of Strathbeg SPA, SSSI and Ramsar, Meikle Loch and Kippet Hills SSSI	Non-breeding														
Guillemot ( <i>Uria aalge</i> )	Buchan Ness to Collieston Coast SPA, Bullers to Buchan Coast SSSI, Collieston to Whinnyfold Coast SSSI	Breeding														
Herring gull ( <i>Larus argentatus</i> )	Buchan Ness to Collieston Coast SPA	Breeding														
Kittiwake ( <i>Rissa tridactyla</i> )	Buchan Ness to Collieston Coast SPA, Bullers to Buchan Coast SSSI, Collieston to Whinnyfold Coast SSSI	Breeding														
Little tern ( <i>Sterna albifrons</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Breeding														
Pink-footed goose ( <i>Anser brachyrhynchus</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Loch of Strathbeg SPA, SSSI and	Non-breeding														





Protected species	Site	Sensitivity	Seasonality													
			J	F	M	A	M	J	J	A	S	O	N	D		
	Ramsar, Meikle Loch and Kippit Hills SSSI															
Sandwich tern ( <i>Sterna sandvicensis</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Loch of Strathbeg SPA	Breeding														
Shag ( <i>Phalacrocorax aristotelis</i> )	Buchan Ness to Collieston Coast SPA, Bullers to Buchan Coast SSSI	Breeding														
Svalbard barnacle goose ( <i>Branta leucopsis</i> )	Loch of Strathbeg SPA and Ramsar	Non-breeding														
Teal ( <i>Anas crecca</i> )	Loch of Strathbeg SPA and Ramsar	Non-breeding														
Razorbill ( <i>Alca torda</i> )	Collieston to Whinnyfold Coast SSSI	Breeding														
Redshank ( <i>Tringa tetanus</i> )	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Non-breeding														
Whooper swan ( <i>Cygnus cygnus</i> )	Loch of Strathbeg SPA, SSSI and Ramsar	Non-breeding														

<b>Key</b>	Annex I Species		Non-Annex I species	
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#### 9.4.4. Sensitive Receptors

Species identified as sensitive receptors are likely to form the main focus of the MEA. These include Annex I species for which sites are designated, as well as those which are considered to be particularly sensitive to disturbance due to factors such as their abundance, particular biological characteristics, and susceptibility to disturbance. A number of marine birds may be impacted by underwater noise pressures that result from visual disturbances caused by vessel traffic or changes in water clarity affecting the ability of the birds to forage successfully.

Whilst seaducks (such as shelduck) and waders are considered to be sensitive to noise and visual disturbance, divers, grebes and mergansers are considered highly sensitive to noise and visual disturbance, such as that caused by vessel traffic (Atterbury et al., 2021). Inshore activities at the intertidal zone and those at the location of the cable landfall, will disturb waders who spend large portions of time in those areas (Fliessbach et al., 2019). Terns, gulls, kittiwakes and gannets are considered to have low to moderate sensitivity to noise and visual disturbance. Species which plunge dive for prey e.g., divers and terns are sensitive to changes in water clarity which impedes the ability to locate prey species. Auks such as guillemot and razorbill have been identified as protected features of the designated sites within the Study Area. Adult and chick auks have a flightless moult period immediately after chicks fledge from the nest, which can last for several months. During this period adults and chicks are particularly sensitive to pressures including visual disturbance and noise (JNCC and Natural England, 2022).

#### 9.5. Proposed Assessment Methodology

The intertidal and offshore ornithology MEA will follow the assessment approach set out in Chapter 4 of this Scoping Report, using the project-wide assessment matrix. The assessment of potential effects will be established using the standard Source-Pathway-Receptor approach.

The results from studies completed to inform other topics e.g., sediment dispersion modelling, sandeel and Atlantic herring habitat assessment will be used to establish the potential significance of impacts on ornithology receptors.

Where impacts are not predicted to be significant, simple assessments, using an evidence-based approach that is proportionate to the anticipated level of significance will be undertaken. Where potentially significant impacts are identified, consultation will be undertaken with statutory nature conservation bodies to agree proportionate and effective mitigation, and residual effects will be presented.

The Intertidal and Offshore Ornithology MEA will be prepared in accordance with relevant MEA guidance and industry best practice documents including National Infrastructure Planning advice notes; professional MEA guidance documents and Natural England Offshore wind cabling: ten years' experience and recommendations (Natural England, 2018a). Most of the guidance on the potential impacts of offshore development on birds focuses on renewable energy generation. This guidance will be referred to where relevant and proportionate to the level of construction activity required for the installation of submarine cables.



## 9.6. Scope of Assessment

A range of potential impacts on intertidal and offshore ornithology have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Project. Table 9-10 describes the potential impacts identified and justification as to whether they will be scoped in or out of the MEA. A precautionary approach has been taken and where there is no strong evidence base, or the significance is uncertain at this stage the impact has been scoped into the MEA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped 'out' of the MEA.

Where relevant, bird species have been grouped according to their sensitivity to disturbance or their method of feeding after Atterbury et al. (2021).

Whilst it is acknowledged that some purely onshore species may use the intertidal area for foraging, passage or loafing, the proposed Project will have very limited interaction with the intertidal area should the preferred method of using a trenchless technology (such as HDD) to install the cables within the intertidal area be used, however, some disturbance to species using the intertidal area may occur should open cut trenching being used. Works associated with the transition from offshore to onshore such as the trenching or HDD punch out and cable pull-in may require personnel and equipment on the intertidal area, but this will be limited in duration. Components such as a HDD compound are part of the scope of the Onshore Scheme, of which the potential impacts will be assessed in the terrestrial environmental assessment.



Table 9-10: Scoping assessment of impacts on intertidal on offshore ornithology

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
Temporary increase and deposition of suspended sediments <i>(Changes in suspended solids (water clarity))</i>	Boulder clearance, PLGR, pre-sweeping of sand waves. HDD duct excavation. Open cut trenching Cable burial and trenching. Deposit of external cable protection.	Divers, grebes and mergansers	<p><b>OUT</b> – Diving species such as red-throated divers dive for prey and rely on clear vision for success. A reduction in water clarity as a result of increased suspended solids in the water column following disturbance of seabed sediments (i.e., because of route clearance, seabed preparation, cable burial, deposition of external cable protection and repair/remediation works), could negatively impact foraging success. In addition, the deposition of suspended sediments from the water column has the potential to smother potential prey species which live on the sea floor, thus reducing prey abundance.</p> <p>However, as described in Chapter 6 Marine Physical Environment, there is evidence that any sediment plumes will be rapidly dissipated as result of natural current flow. In addition, the footprint of the Project is sufficiently narrow such that a relatively small area of the seabed will be affected at any one time. Diving birds will therefore have sufficient alternative feeding grounds and prey species available and as a result are unlikely to be significantly adversely affected by a temporary reduction in water clarity or deposition of suspended sediments.</p>		
		Seaducks, geese and swans	<p><b>OUT</b> – Some species of sea ducks, geese and swans present in the designated sites as protected species are classified as 'diving ducks' according to the RSPB (2022), including eider, goldeneye and pochard. There are also species of surface feeders including shelduck, teal and wigeon that may on occasion 'shallow dive' in search of invertebrates, shellfish and aquatic snails. Therefore, there is potential for an adverse impact on their foraging abilities as a result of decreased water clarity. However, as described in Chapter 6 Marine Physical Environment, there is evidence that any sediment plumes are likely to be rapidly dissipated as result of natural current flow. In addition, the footprint of the Project is sufficiently narrow such that a relatively small area of the seabed will be affected at any one time. Diving birds will therefore have sufficient alternative feeding grounds available and as a result are unlikely to be significantly adversely affected by a temporary reduction in water clarity.</p>		
		Terns, gulls, kittiwakes and gannets	<p><b>OUT</b> – Diving birds such as kittiwake, common tern and little tern, which are protected features across a number of designated sites in the Study Area, plunge dive for food and therefore there is potential for an adverse impact on their foraging abilities as a result of decreased water clarity. Kittiwake are particularly vulnerable to food shortages as a result of increased suspended sediments, as they can only take prey when it occurs near to the surface of the sea, unlike auks which have the ability to dive to greater depths for a variety of prey in the water column (Wanless et al., 2018). However, as described in Chapter 6 of this Scoping Report, there is evidence that any sediment plumes are likely to be rapidly dissipated as result of natural current flow. In addition, the footprint of the Project is sufficiently narrow such that a relatively small area of the seabed will be affected at any one time. Diving birds will therefore have sufficient alternative feeding grounds available and as a result are unlikely to be significantly adversely affected by a temporary reduction in water clarity.</p>		
		Harriers and Waders	<p><b>OUT</b> – Wading birds and harriers do not dive for food and are therefore very unlikely to be adversely affected by a decrease in water clarity as a result of increased suspended sediments during any stage of the Project.</p>		
		Auks	<p><b>OUT</b> – Auks feed on pelagic and demersal fish in the water column (Atterbury et al., 2021). Therefore, there is potential for an adverse impact on their foraging abilities as a result of decreased water clarity due to increased suspended solids in the water column following disturbance of seabed sediments (i.e., because of route clearance, seabed preparation, cable burial, deposition of external cable protection and repair/remediation works).</p> <p>However, as described in Chapter 6 Marine Physical Environment, there is evidence that any sediment plumes will be rapidly dissipated as result of natural current flow. In addition, the footprint of the Project is sufficiently narrow such that a relatively small area of the seabed will be affected at any one time. Auks will therefore have sufficient alternative feeding grounds available and as a result are unlikely to be significantly adversely affected by a temporary reduction in water clarity.</p>		
		Changes in distribution of prey species	Pre-sweeping of sand waves. Cable burial and trenching.	All species	<p><b>OUT</b> – Pre-sweeping of the seabed and the installation of the cable will cause a localised, temporary loss of habitat leading to a potential reduction in prey availability. However, these activities will take place over a relatively small area of the seabed, and there will be sufficient alternative foraging areas available. In addition, these activities are transient in nature. The seabed</p>



Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
			habitat will recover and will continue to support prey species within the short-term. These activities are therefore not considered to significantly adversely affect the prey availability for bird species within the Study Area.		
	Deposit of external cable protection.	All species	<b>IN</b> – The deposition of cable protection will result in permanent alteration of affected areas of the seabed. This has the potential to reduce areas of habitat for prey species such as sandeel and herring and consequently reduce prey availability for bird species in the Study Area. Further assessment will be undertaken within the MEA to evaluate the sensitivity of relevant prey species to habitat alteration.	<b>IN</b> - If the cable is installed correctly the likelihood of it requiring maintenance and repair is significantly reduced. However, there remains the potential that remedial external cable protection may be required in discrete locations which has the potential to reduce sandeel and herring habitat and therefore reduce prey availability.	<b>OUT</b> – No additional cable protection will be deposited for decommissioning therefore it can be scoped out.
Visual / physical disturbance or displacement	Presence of project vessels and equipment. Open cut trenching within the intertidal.	Divers, grebes and mergansers	<b>IN</b> - Diving species such as red-throated divers are recognised as being highly sensitive to noise and visual disturbance, such as that caused by vessel traffic (Atterbury <i>et al.</i> , 2021). Once flushed, they may not rapidly resettle. It is recommended that vessel transit through SPAs where these species are present should be avoided where possible. The extent of the potential impact of project vessels during all phases of the project life cycle on diving species will be considered further as part of the MEA.		
		Seaducks, geese and swans	<b>IN</b> – Species present within this group such as shelduck are considered to be sensitive to noise and visual disturbance (Atterbury <i>et al.</i> , 2021), and it is not known how rapidly they resettle following disturbance. The extent of the potential impact of project vessels (especially at the landfall /intertidal area) during all phases of the project life on this group will be considered further as part of the MEA.		
		Terns, gulls, kittiwakes and gannets	<b>OUT</b> – These species are considered to be low to moderately sensitive to noise and visual disturbance (Atterbury <i>et al.</i> , 2021). It is not considered that the presence of the project vessels is likely to have a significant impact on this group.		
		Harriers and Waders	<b>IN</b> – These species are considered to be sensitive to noise and visual disturbance (Atterbury <i>et al.</i> , 2021). Although they are largely present within the intertidal areas rather than offshore, there is the potential for them to be disturbed if open cut trenching is used in the intertidal and due to vessel traffic during works in close proximity to the landfall and intertidal area. The extent of any potential impact on these species will be considered further as part of the MEA.		
		Auks	<b>IN</b> - Species present within this group such as guillemot and razorbill are sensitive to noise (Atterbury <i>et al.</i> , 2021). Post-breeding, they moult and become flightless, forming large aggregations on the water. Disturbance during this time could be significant and this group will be considered further as part of the MEA.		
Accidental spills (Hydrocarbon & PAH contamination)	Presence of project vessels and equipment.	All species	<b>OUT</b> - Project vessels and contractors will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 which relate to pollution from oil from equipment, fuel tanks etc and release of sewage (black and grey water). It is a legal requirement that all vessels have a Shipboard Oil Pollution Emergency Plan (SOPEP). Compliance with Regulations will be sufficient to minimise the risk to the environment.		



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