

Appendix A Environmental Baseline

A.1 Introduction

This appendix describes aspects of the environment which have the potential to be affected by the proposed cargo transfers.

A.2 Biodiversity, Fauna and Flora

The Cromarty Firth is a large estuary within the Moray Firth and is, along with the surrounding land and sea, one of the most environmentally sensitive areas in the UK. It is a marine inlet with a narrow, deep water entrance to the Moray Firth. The entrance is approximately 1.5 km wide between the headlands of the North and South Sutors and approximately 50 m deep. The outer Cromarty Firth is in excess of 6.5 km wide in places and consists of the extensive bays of Nigg, Udale and Cromarty. Within the Firth, it narrows to 2 km at Invergordon and extends southwest round Alness Bay to Dingwall and the mouth of the River Conon. Landwards of Invergordon the firth is estuarine whereas the deep waters seaward of Invergordon are highly saline.

The Cromarty Firth has a range of estuarine habitats including sand and mud flats, shingle banks, saltmarsh, mussel beds and coastal lagoons. The sand and mud flats support a rich and abundant invertebrate faunal community as well as mussel beds and extensive growths of seagrass in Alness, Nigg and Udale Bays. There is some saltmarsh habitat present in the estuary but it is not very extensive. The most important areas are at the head of Dingwall and Udale Bays, at Alness Point, Nigg Bay and at the Conon Islands.

The sheltered bays, intertidal flats and saltmarshes within the Cromarty Firth provide roosting and feeding grounds for internationally important numbers of wintering wildfowl and waders. There is also a shingle bar and coastal lagoon at Alness Point which supports important breeding bird populations.

The North and South Sutors are rocky headlands whose maritime cliffs support the only breeding seabird colony in the Inner Moray Firth. The coast to the north and south of the Sutors is also steep and supports other coastal habitats such as grassland and scrub. The coastal waters provide habitats for finfish, flatfish and shellfish, whilst the coast is rich in wildlife and is important for seals and seabirds and cetaceans (Moray Firth Partnership, 2007a).

A.2.1 European and Nationally Designated Sites

The Cromarty Firth, and the surrounding coastline and waters of the Moray Firth, is a region which is generally unspoilt and valued for its rich diversity of habitats and species. As such, this region includes a wide range of protected sites designated under European, international and national legislation. The main relevant protected site designations are as follows:

- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- Ramsar Sites
- Nature Conservation Marine Protection Areas (NCMPAs)
- Sites of Special Scientific Interest (SSSIs)
- National Nature Reserves (NNRs)

The study area encompasses an area with a 100 km radius from the STS locations in the Cromarty Firth. However, not all designated sites within this area will interact or be impacted by the project e.g. sites designated for terrestrial features only. Therefore, the baseline description of designated sites (both existing and future designations) covers the following identified designated sites:

- SPAs with marine components within 100 km of the STS locations
- SACs with marine components intersecting the coast with the Moray Firth and within 100 km of the STS locations
- Ramsar Sites within 100 km of the STS locations
- MPAs which are within the Moray Firth and 100 km of the STS locations
- SSSIs which intersect or are close to the coast within the Moray Firth and 100km of the STS locations
- NNRs which intersect or are close to the coast within the Moray Firth and 100km of the STS locations

All of the above sites designating features are presented in Table A-1.

Natura 2000 Sites

Under the Habitats Directive (Council Directive 92/43/EC) and Birds Directive (Council Directive 2009/147/EC) Europe's most valuable habitats and species are protected through the designation of SACs and SPAs. Together these sites make up the Natura 2000 network. The aim of the Natura 2000 network is to ensure the long-term survival of European threatened species and habitats.

Special Areas of Conservation (SACs)

SACs are designated sites under the Habitats Directive (Council Directive 92/43/EC). SACs are selected for particular habitats listed on Annex I and for species listed on Annex II of the Habitats Directive. Only SACs with a marine component (designated for marine features), or with a marine connection (freshwater SACs with anadromous, migratory fish e.g. Atlantic salmon and lamprey) have been identified within the study area. There are five relevant SACs in the study area, see Figure A-1:

- Berriedale and Langwell Waters
- Culbin Bar
- Dornoch Firth and Morrich More
- Lower River Spey – Spey Bay SAC
- Moray Firth
- River Spey
- River Oykel

Special Protection Areas (SPAs)

SPAs are classified under the Birds Directive (Council Directive 2009/147/EC). SPAs are selected for a number of rare, threatened or vulnerable bird species listed in Article 4 of the Birds Directive, and also for regularly occurring migratory species. There are 13 SPA and one draft SPA in the study area Figure A-2:

- Cromarty Firth
- Dornoch Firth and Loch Fleet
- East Caithness Cliffs
- Inner Moray Firth
- Loch Eye
- Loch Flemington
- Moray Firth (draft)
- Moray and Nairn Coast
- North Caithness Cliffs
- North Sutherland Coastal Islands
- Priest Island (Summer Isles)
- Tips of Corsemaul and Tom Mór
- Troup, Pennan and Lion`s Heads
- Wester Ross Lochs

Ramsar Sites

Ramsar sites are designated under the Convention on Wetlands (Ramsar, Iran, 1971), known as the "Ramsar Convention" to protect wetlands of international importance. In Scotland all Ramsar sites are also either SPAs or SACs, and many are also SSSIs, although the boundaries of the different designations are not always exactly the same. Although there is no specific legal framework that safeguards Scottish Ramsar sites, they are afforded the same protection as the Natura sites they overlap. There are thirteen Ramsar Sites in the study area, see Figure A-3:

- Cairngorm Lochs
- Caithness and Sutherland Peatlands
- Caithness Lochs
- Cromarty Firth
- Dornoch Firth and Loch Fleet
- Inner Moray Firth
- Loch Eye
- Loch Maree
- Loch Ruthven
- Loch Spynie
- Moray and Nairn Coast

- Muir of Dinnet
- River Spey - Insh Marshes

Sites of Special Scientific Interest (SSSIs)

SSSIs are nationally important areas of land and water (above mean low water) in Great Britain. In Scotland, SSSIs are designated by Scottish Natural Heritage (SNH) under the Nature Conservation (Scotland) Act 2004. SSSIs are protected by law and it is an offence for any person to intentionally or recklessly damage the protected natural features of a SSSI. SSSIs in Scotland are those areas that SNH considers to best represent Scottish natural heritage for its diversity of plants, animals, habitats, geology, landforms or a combination of these natural features. Most of the terrestrial Natura sites in Scotland are also SSSIs. There are forty SSSIs in the study area, see Figure A-4:

- Ballinreach Coastal Gorges
- Beaully Firth
- Berriedale Cliffs
- Castle of Old Wick to Craig Hammel
- Craig Hammel to Sgaps Geo
- Cromarty Firth
- Culbin Sands, Culbin Forest and Findhorn Bay
- Cullen to Stake Ness Coast
- Dornoch Firth
- Drummondreach Wood
- Dunbeath to Sgaps Geo
- Easter Fearn
- Gamrie and Pennan Coast
- Garbh Allt
- Hill of Warehouse
- Knockinnon Heath
- Langwell Water
- Ledmore Wood
- Loch Eye
- Loch Fleet
- Loch Spynie
- Longman and Castle Stuart Bays
- Loth Gorge
- Lower River Conon
- Lower River Spey
- Migdale Rock
- Morrich More

- Mound Alderwoods
- Munlochy Bay
- Ousdale Burn
- Reisgill Burn
- River Spey
- Rosemarkie to Shandwick Coast
- Shielton Peatlands
- Spey Bay
- Spinningdale Bog
- Strath Carnaig and Strath Fleet Moors
- Tarbat Ness
- Tore of Troup
- Whiteness Head

Scottish Nature Conservation Marine Protection Areas (NCMPAs)

The Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009 include powers for Scottish Ministers to designate Nature Conservation Marine Protected Areas (MPAs) in Scotland's seas as part of a range of measures to manage and protect Scotland's seas for current and future generations.

Joint Nature Conservation Committee (JNCC) and SNH have applied the Site Selection Guidelines to identify Nature Conservation MPAs that together with existing protected areas will form a network of MPAs. The process will also help Scotland meet its contribution to UK commitments under international conventions and legislation such as the Convention on Biological Diversity, and the OSPAR Convention for an ecologically coherent network of MPAs.

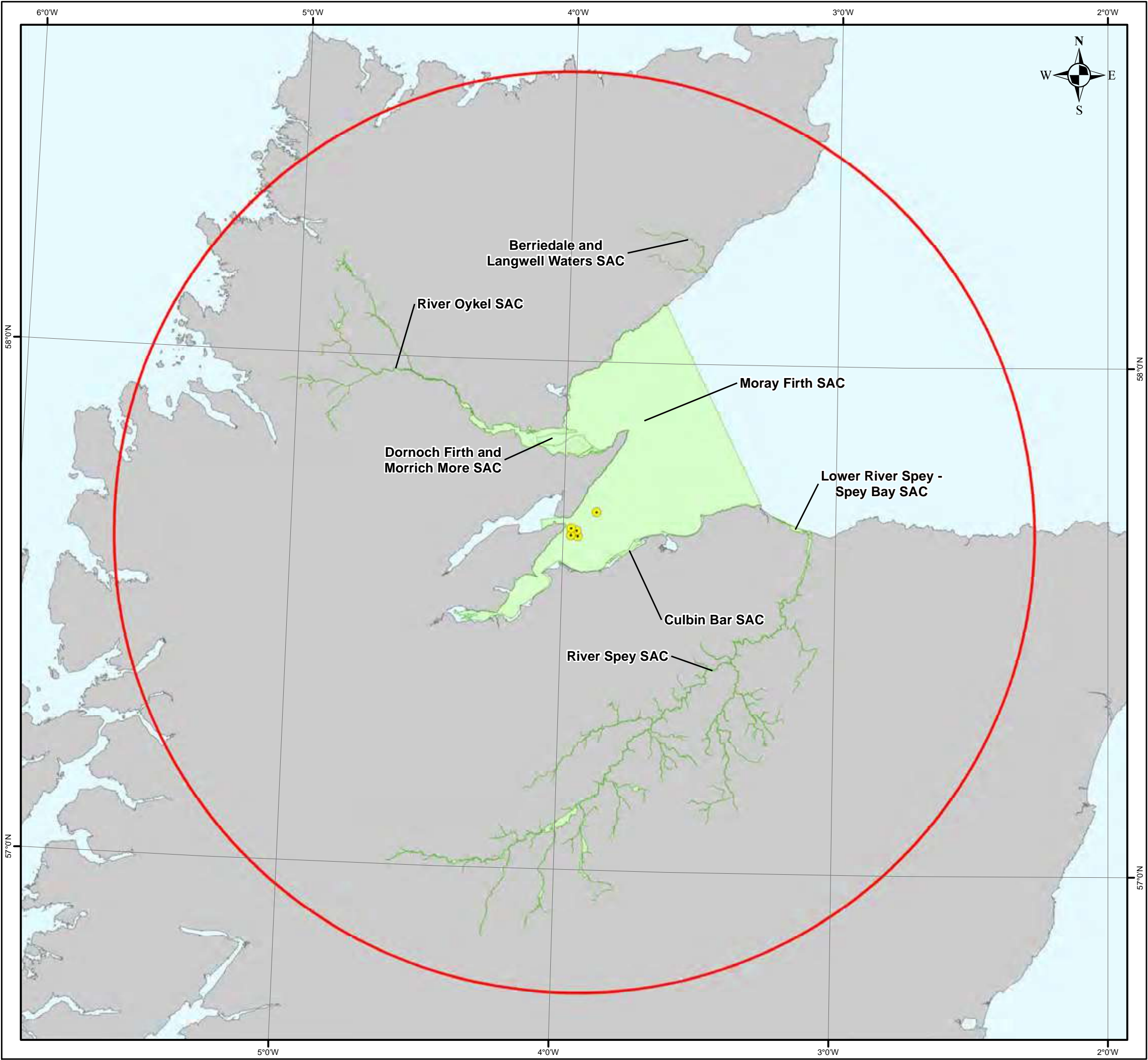
In July 2014, Scottish Ministers designated 30 Nature Conservation Marine Protected Areas to conserve some of Scotland's most important marine wildlife, habitats and geodiversity. On the same date SNH submitted formal advice to Scottish Government recommending an additional four MPA proposals for designation as Nature Conservation MPAs. There is one designated NCMPA and one NCMPA proposal in the study area, see Figure A-5:

- East Caithness Cliffs NCMPA
- Southern Trench NCMPA proposal

National Nature Reserves (NNRs)

NNRs are areas of land set aside for nature, where the main purpose of management is the conservation of habitats and species of national and international significance. SNH is responsible for declaring NNRs formerly declared under the 1949 National Parks and Access to the Countryside Act but now under the Wildlife and Countryside Act 1981, because this law introduced changes making it possible to declare National Nature Reserves on land managed by other organisations or 'approved bodies' too. There is one designated NNR in the study area see Figure A-6:

- Loch Fleet



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Figure A-1: SACs within Study Area

Legend

- STS Locations
- Search Area (100 km)
- SAC

NOTE: Not to be used for Navigation

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Projection	World_Mercator
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, JNCC
File Reference	J:\P1946\Mxd\Report\Appendix_A\ SAC_Sites.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij



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0 5 10 20 30 40 km

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Figure A-2: SPAs within Study Area

Legend

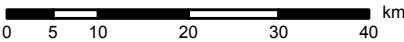
- STS Locations
- Search Area (100 km)
- ▨ SPA
- ▤ Draft SPA

NOTE: Not to be used for Navigation

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File Reference	J:\P1946\Mxd\Report\Appendix_A\SPA_Sites.mxd
Created By	Emma Langley
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Figure A-3: Ramsar Sites within Study Area

Legend

- STS Locations
- ◻ Search Area (100 km)
- ▨ Ramsar

NOTE: Not to be used for Navigation

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Datum	D_WGS_1984
Data Source	UKHO, SNH
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Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij







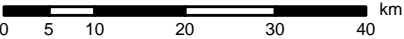
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Figure A-4: SSSIs within Study Area

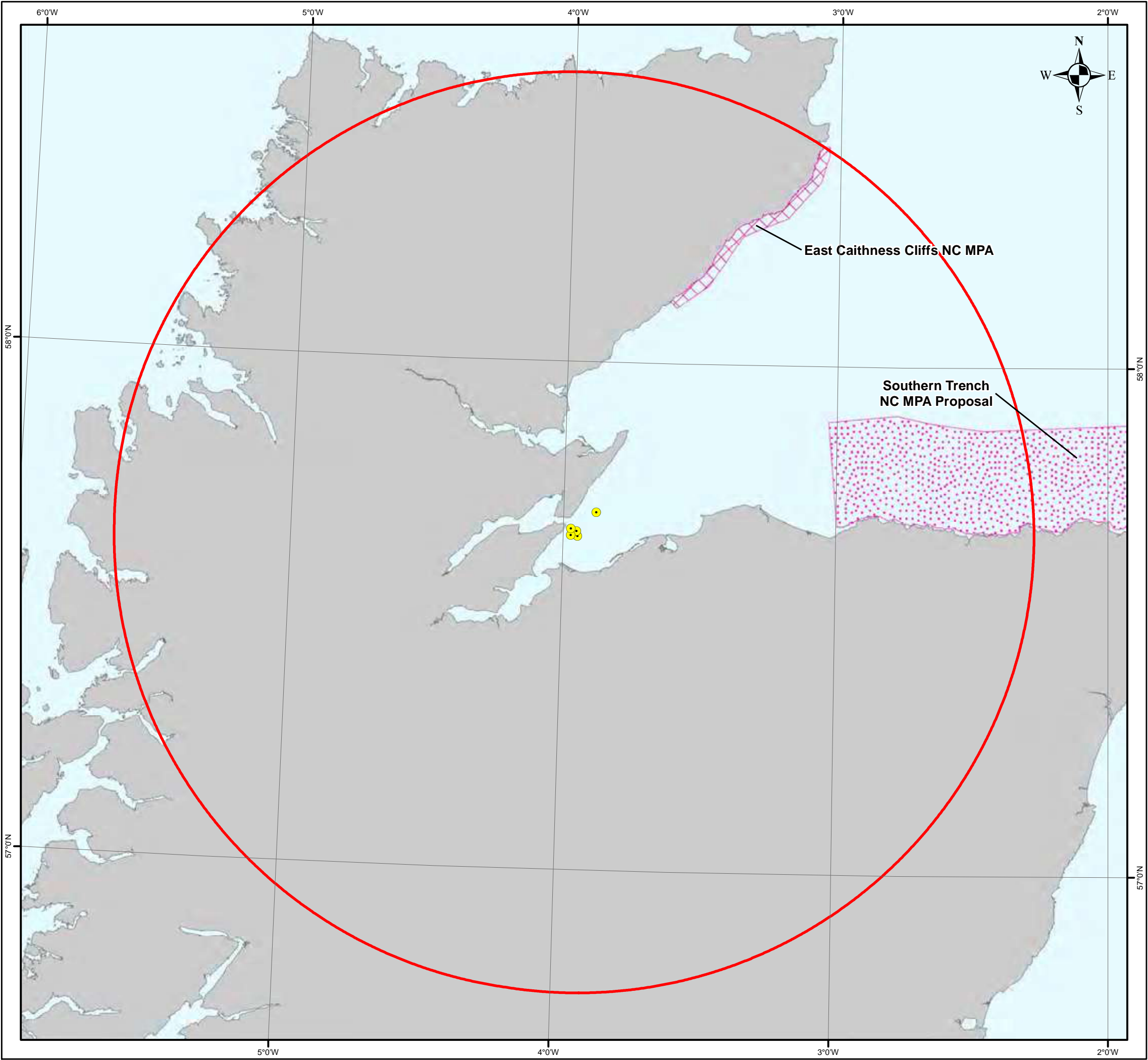
Legend

- STS Locations
- Search Area (100 km)
- ▨ SSSI

NOTE: Not to be used for Navigation

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Figure A-5: Nature Conservation MPAs
within Study Area

Legend

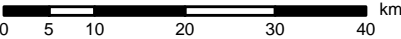
- STS Locations
- ◻ Search Area (100 km)
- ▨ NC MPA
- ▤ NC MPA Proposal

NOTE: Not to be used for Navigation

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Figure A-6: NNRs within Study Area

Legend

- STS Locations
- Search Area (100 km)
- NNR

NOTE: Not to be used for Navigation

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Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, SNH
File Reference	J:\P1946\Mxd\Report\Appendix_A\ NNR.mxd
Created By	Emma Langley
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Approved By	Chris Mooij



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Table A-1: Sites to be considered in the environmental assessment (JNCC, 2015; SNH, 2015)

Designation	Site Name	Site Code	Designating features and comments
SSSI	Ballinreach Coastal Gorges	128	Broad-leaved, mixed and yew woodland: Upland birch woodland Stratigraphy: Kimmeridgian
SSSI	Beaully Firth	159	Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - aggregations of non-breeding birds: Red-breasted merganser (<i>Mergus serrator</i>), non-breeding Birds - aggregations of non-breeding birds: Goosander (<i>Mergus merganser</i>), non-breeding Littoral sediment (Coast): Saltmarsh Vascular plants: Vascular plant assemblage
SSSI	Berriedale Cliffs	200	Birds - aggregations of breeding birds: Fulmar (<i>Fulmarus glacialis</i>), breeding Birds - aggregations of breeding birds: Razorbill (<i>Alca torda</i>), breeding Birds - aggregations of breeding birds: Kittiwake (<i>Rissa tridactyla</i>), breeding Birds - aggregations of breeding birds: Seabird colony, breeding Birds - aggregations of breeding birds: Guillemot (<i>Uria aalge</i>), breeding Birds - aggregations of breeding birds: Shag (<i>Phalacrocorax aristotelis</i>), breeding Supralittoral rock (Coast): Maritime cliff
SAC	Berriedale and Langwell Waters	8206	Annex II species that are a primary reason for selection of this site: Atlantic salmon (<i>Salmo salar</i>)
Ramsar	Cairngorm Lochs	8411	Ramsar Site Qualifying Feature category and Features: Standing open water and canals: Oligotrophic loch
Ramsar	Caithness and Sutherland Peatlands	8412	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of breeding birds: Dunlin (<i>Calidris alpina schinzii</i>), breeding Birds - aggregations of breeding birds: Greylag goose (<i>Anser anser</i>), breeding Birds - assemblages of breeding birds: Breeding bird assemblage
Ramsar	Caithness Lochs	8413	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding Birds - aggregations of non-breeding birds: Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>), non-breeding Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding
SSSI	Castle of Old Wick to Craig Hammel	344	Supralittoral rock (Coast): Maritime cliff
SSSI	Craig Hammel to Sgaps Geo	418	Birds - aggregations of breeding birds: Kittiwake (<i>Rissa tridactyla</i>), breeding Birds - aggregations of breeding birds: Razorbill (<i>Alca torda</i>), breeding Birds - aggregations of breeding birds: Seabird colony, breeding Birds - aggregations of breeding birds: Guillemot (<i>Uria aalge</i>), breeding Supralittoral rock (Coast): Maritime cliff

Designation	Site Name	Site Code	Designating features and comments
Ramsar	Cromarty Firth	8418	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding Littoral sediment (Marine) Intertidal mudflats and sandflats
SPA	Cromarty Firth	8488	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: Common Tern (<i>Sterna hirundo</i>), 294 pairs representing at least 2.4% of the breeding population in Great Britain Osprey (<i>Pandion haliaetus</i>), 1 pairs representing at least 1.0% of the breeding population in Great Britain Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: Bar-tailed Godwit (<i>Limosa lapponica</i>), 1,420 individuals representing at least 2.7% of the wintering population in Great Britain Whooper Swan (<i>Cygnus cygnus</i>), 55 individuals representing at least 1.0% of the wintering population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: Greylag Goose (<i>Anser anser</i>), 1,777 individuals representing at least 1.8% of the wintering Iceland/UK/Ireland population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance Over winter, the area regularly supports 34,847 individual waterfowl including: Redshank (<i>Tringa totanus</i>), Curlew (<i>Numenius arquata</i>), Dunlin (<i>Calidris alpina alpina</i>), Knot (<i>Calidris canutus</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Red-breasted Merganser (<i>Mergus serrator</i>), Scaup (<i>Aythya marila</i>), Pintail (<i>Anas acuta</i>), Wigeon (<i>Anas penelope</i>), Greylag Goose (<i>Anser anser</i>), Bar-tailed Godwit (<i>Limosa lapponica</i>), Whooper Swan (<i>Cygnus cygnus</i>) .
SSSI	Cromarty Firth	467	Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Birds - aggregations of non-breeding birds: Redshank (<i>Tringa totanus</i>), non-breeding Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding Birds - aggregations of non-breeding birds: Red-breasted merganser (<i>Mergus serrator</i>), non-breeding Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Mudflats Littoral sediment (Marine): Sandflats
SAC	Culbin Bar	8238	Annex I habitats that are a primary reason for selection of this site: Perennial vegetation of stony banks Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) Embryonic shifting dunes

Designation	Site Name	Site Code	Designating features and comments
SSSI	Culbin Sands, Culbin Forest and Findhorn Bay	478	Fen, marsh and swamp (Wetland): Hydromorphological mire range Fungi: Fungi assemblage Geomorphology: Coastal Geomorphology of Scotland Lichen: Lichen assemblage Littoral sediment (Coast): Saltmarsh Other invertebrates: Invertebrate assemblage Standing open water and canals: Mesotrophic loch Supralittoral sediment (Coast): Shingle Supralittoral sediment (Coast): Sand dunes Vascular plants: Vascular plant assemblage
SSSI	Cullen to Stake Ness Coast	480	Dwarf shrub heath: Lowland dry heath Fen, marsh and swamp (Wetland): Springs (including flushes) Littoral sediment (Coast): Saltmarsh Quaternary geology and geomorphology: Quaternary of Scotland Structural and metamorphic geology: Dalradian Supralittoral sediment (Coast): Shingle
SSSI	Dornoch Firth	527	Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Eelgrass beds Supralittoral sediment (Coast): Sand dunes Vascular plants: Vascular plant assemblage
Ramsar	Dornoch Firth and Loch Fleet	8420	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Littoral rock (Marine): Reefs Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Intertidal mudflats and sandflats Supralittoral sediment (Coast): Sand dune

Designation	Site Name	Site Code	Designating features and comments
SPA	Dornoch Firth and Loch Fleet	8490	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season:</p> <p>Osprey (<i>Pandion haliaetus</i>), 10 pairs representing at least 10.0% of the breeding population in Great Britain</p> <p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter:</p> <p>Bar-tailed Godwit (<i>Limosa lapponica</i>), 1,300 individuals representing at least 2.5% of the wintering population in Great Britain</p> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter:</p> <p>Greylag Goose (<i>Anser anser</i>), 2,079 individuals representing at least 2.1% of the wintering Iceland/UK/Ireland population</p> <p>Wigeon <i>Anas penelope</i>, 15,304 individuals representing at least 1.2% of the wintering Western Siberia/Northwestern/Northeastern Europe population</p> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance:</p> <p>Over winter, the area regularly supports 34,837 individual waterfowl including: Curlew (<i>Numenius arquata</i>), Dunlin (<i>Calidris alpina alpina</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Teal (<i>Anas crecca</i>), Wigeon (<i>Anas penelope</i>), Greylag Goose (<i>Anser anser</i>), Bar-tailed Godwit (<i>Limosa lapponica</i>).</p>
SAC	Dornoch Firth and Morrich More	8242	<p>Annex I Habitats that are a primary reason for selection of this site</p> <p>Estuaries</p> <p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Salicornia and other annuals colonizing mud and sand</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</p> <p>Embryonic shifting dunes</p> <p>"Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")"</p> <p>"Fixed coastal dunes with herbaceous vegetation ("grey dunes")" * Priority feature</p> <p>Decalcified fixed dunes with <i>Empetrum nigrum</i> * Priority feature</p> <p>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) * Priority feature</p> <p>Humid dune slacks</p> <p>Coastal dunes with <i>Juniperus</i> spp. * Priority feature</p> <p>Annex I Habitats present as a qualifying feature but not a primary reason for site selection</p> <p>Sandbanks which are slightly covered by sea water all the time</p> <p>Reefs</p> <p>Annex II species that are a primary reason for selection of this site</p> <p>Otter <i>Lutra lutra</i></p> <p>Harbour seal <i>Phoca vitulina</i></p>
SSSI	Drummondreach Wood	540	Broad-leaved, mixed and yew woodland: Upland oak woodland

Designation	Site Name	Site Code	Designating features and comments
SSSI	Dunbeath to Sgaps Geo	561	Supralittoral rock (Coast): Maritime cliff
SPA	East Caithness Cliffs	8492	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season:</p> <ul style="list-style-type: none"> • Peregrine (<i>Falco peregrinus</i>), 6 pairs representing at least 0.5% of the breeding population in Great Britain <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> • Guillemot (<i>Uria aalge</i>), 71,509 pairs representing at least 3.2% of the breeding East Atlantic population • Herring Gull (<i>Larus argentatus</i>), 9,370 pairs representing at least 1.0% of the breeding Northwestern Europe (breeding) and Iceland/Western Europe – breeding population • Kittiwake (<i>Rissa tridactyla</i>), 31,930 pairs representing at least 1.0% of the breeding Eastern Atlantic – Breeding population • Razorbill (<i>Alca torda</i>), 9,259 pairs representing at least 1.6% of the breeding population • Shag (<i>Phalacrocorax aristotelis</i>), 2,345 pairs representing at least 1.9% of the breeding Northern Europe population <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance:</p> <p>During the breeding season, the area regularly supports 300,000 individual seabirds including: Puffin (<i>Fratercula arctica</i>), Great Black-backed Gull (<i>Larus marinus</i>), Cormorant (<i>Phalacrocorax carbo</i>), Fulmar (<i>Fulmarus glacialis</i>), Razorbill (<i>Alca torda</i>), Guillemot (<i>Uria aalge</i>), Kittiwake (<i>Rissa tridactyla</i>), Herring Gull (<i>Larus argentatus</i>), Shag (<i>Phalacrocorax aristotelis</i>).</p>
NC MPA	East Caithness Cliffs	10408	East Caithness Cliffs MPA is designated for the biodiversity feature: Black guillemots. The MPA encompasses nearshore waters off the coast between Wick and Helmsdale used for foraging by over 1,500 breeding black guillemots.
SSSI	Easter Fearn	589	Broad-leaved, mixed and yew woodland: Upland birch woodland
SSSI	Gamrie and Pennan Coast	666	<p>Birds - aggregations of breeding birds: Guillemot (<i>Uria aalge</i>), breeding</p> <p>Birds - aggregations of breeding birds: Kittiwake (<i>Rissa tridactyla</i>), breeding</p> <p>Birds - aggregations of breeding birds: Seabird colony, breeding</p> <p>Birds - aggregations of breeding birds: Razorbill (<i>Alca torda</i>), breeding</p> <p>Birds - aggregations of breeding birds: Puffin (<i>Fratercula arctica</i>), breeding</p> <p>Birds - aggregations of breeding birds: Fulmar (<i>Fulmarus glacialis</i>), breeding</p> <p>Birds - aggregations of breeding birds: Gannet (<i>Morus bassanus</i>), breeding</p> <p>Quaternary geology and geomorphology: Quaternary of Scotland</p> <p>Structural and metamorphic geology: Dalradian</p> <p>Supralittoral rock (Coast): Maritime cliff</p>
SSSI	Garbh Allt	669	Broad-leaved, mixed and yew woodland: Upland birch woodland
SSSI	Hill of Warehouse	787	Fen, marsh and swamp (Wetland): Hydromorphological mire range

Designation	Site Name	Site Code	Designating features and comments
			Fen, marsh and swamp (Wetland): Valley fen
Ramsar	Inner Moray Firth	8430	<p>Ramsar Site Qualifying Feature category and Features:</p> <p>Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding</p> <p>Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding</p> <p>Birds - aggregations of non-breeding birds: Redshank (<i>Tringa totanus</i>), non-breeding</p> <p>Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding</p> <p>Birds - aggregations of non-breeding birds: Red-breasted merganser (<i>Mergus serrator</i>), non-breeding</p> <p>Littoral sediment (Coast): Saltmarsh</p> <p>Littoral sediment (Marine): Intertidal mudflats and sandflats</p> <p>Supralittoral sediment (Coast): Sand dune</p> <p>Supralittoral sediment (Coast): Shingle</p>
SPA	Inner Moray Firth	8515	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season:</p> <p>Common Tern (<i>Sterna hirundo</i>), 310 pairs representing at least 2.5% of the breeding population in Great Britain</p> <p>Osprey (<i>Pandion haliaetus</i>), 4 pairs representing at least 4.0% of the breeding population in Great Britain</p> <p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter:</p> <p>Bar-tailed Godwit (<i>Limosa lapponica</i>), 1,155 individuals representing at least 2.2% of the wintering population in Great Britain</p> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter:</p> <p>Greylag Goose (<i>Anser anser</i>), 1,731 individuals representing at least 1.7% of the wintering Iceland/UK/Ireland population</p> <p>Red-breasted Merganser (<i>Mergus serrator</i>), 1,731 individuals representing at least 1.4% of the wintering Northwestern/Central Europe population</p> <p>Redshank (<i>Tringa totanus</i>), 1,811 individuals representing at least 1.2% of the wintering Eastern Atlantic - wintering population</p> <p>Scaup (<i>Aythya marila</i>), 97 individuals representing <0.1% of the wintering Northern/Western Europe population</p> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance</p> <p>Over winter, the area regularly supports 33,148 individual waterfowl including:</p> <p>Scaup (<i>Aythya marila</i>), Curlew (<i>Numenius arquata</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Goosander (<i>Mergus merganser</i>), Goldeneye (<i>Bucephala clangula</i>), Teal (<i>Anas crecca</i>), Wigeon (<i>Anas penelope</i>), Cormorant (<i>Phalacrocorax carbo</i>), Redshank (<i>Tringa totanus</i>), Red-breasted Merganser (<i>Mergus serrator</i>), Greylag Goose (<i>Anser anser</i>), Bar-tailed Godwit (<i>Limosa lapponica</i>).</p>
SSSI	Knockinnon Heath	881	Dwarf shrub heath: Lowland dry heath

Designation	Site Name	Site Code	Designating features and comments
SSSI	Langwell Water	908	Broad-leaved, mixed and yew woodland: Upland birch woodland
SSSI	Ledmore Wood	917	Broad-leaved, mixed and yew woodland: Upland oak woodland
Ramsar	Loch Eye	8434	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding
SPA	Loch Eye	8526	Article 4.1 qualification of Directive (79/409/EEC) supporting populations over winter: Whooper Swan <i>Cygnus cygnus</i> , 213 individuals representing at least 3.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species, over winter: Greylag Goose (<i>Anser anser</i>), 11,321 individuals representing at least 11.3% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2 - 1995/6)
SSSI	Loch Eye	982	Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Standing open water and canals: Eutrophic loch
SSSI	Loch Fleet	984	Birds - aggregations of non-breeding birds: Eider (<i>Somateria mollissima</i>), non-breeding Birds - assemblages of breeding birds: Breeding bird assemblage Coniferous woodland: Native pinewood Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Eelgrass beds Littoral sediment (Marine): Sandflats Supralittoral sediment (Coast): Sand dunes Vascular plants: Vascular plant assemblage
NNR	Loch Fleet	5073	n/a
SPA	Loch Flemington	8527	Article 4.1 of Directive (79/409/EEC) supporting populations of European importance during the breeding season: Slavonian Grebe (<i>Podiceps auritus</i>), 5 pairs representing at least 7.1% of the breeding population in Great Britain (5 year mean, 1991-1995).
Ramsar	Loch Maree	8438	Ramsar Site Qualifying Feature category and Features: Standing open water and canals: Oligotrophic loch
Ramsar	Loch Ruthven	8444	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of breeding birds: Slavonian grebe (<i>Podiceps auritus</i>), breeding

Designation	Site Name	Site Code	Designating features and comments
Ramsar	Loch Spynie	8445	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Fen, marsh and swamp (Wetland): Open water transition fen Standing open water and canals: Eutrophic loch
SSSI	Loch Spynie	1054	Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - assemblages of breeding birds: Breeding bird assemblage Broad-leaved, mixed and yew woodland: Wet woodland Fen, marsh and swamp (Grassland): Fen meadow Fen, marsh and swamp (Wetland): Open water transition fen Standing open water and canals: Eutrophic loch
SSSI	Longman and Castle Stuart Bays	1675	Birds - aggregations of non-breeding birds: Goldeneye (<i>Bucephala clangula</i>), non-breeding Birds - aggregations of non-breeding birds: Redshank (<i>Tringa totanus</i>), non-breeding Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Birds - aggregations of non-breeding birds: Cormorant (<i>Phalacrocorax carbo</i>), non-breeding Birds - aggregations of non-breeding birds: Red-breasted merganser (<i>Mergus serrator</i>), non-breeding Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Eelgrass beds Littoral sediment (Marine): Mudflats
SSSI	Loth Gorge	1102	Broad-leaved, mixed and yew woodland: Upland birch woodland
SSSI	Lower River Conon	1105	Broad-leaved, mixed and yew woodland: Wet woodland Fen, marsh and swamp (Wetland): Open water transition fen Littoral sediment (Coast): Saltmarsh
SSSI	Lower River Spey	1107	Broad-leaved, mixed and yew woodland: Wet woodland Geomorphology: Fluvial Geomorphology of Scotland Rivers and streams: River shingle/sand
SSSI	Migdale Rock	1151	Coniferous woodland: Native pinewood Vascular plants: Vascular plant assemblage

Designation	Site Name	Site Code	Designating features and comments
SPA	Moray and Nairn Coast	8550	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season: Osprey <i>Pandion haliaetus</i>, 7 pairs representing at least 7.0% of the breeding population in Great Britain</p> <p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter: Bar-tailed Godwit (<i>Limosa lapponica</i>), 1,156 individuals representing at least 2.2% of the wintering population in Great Britain</p> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter: Greylag Goose (<i>Anser anser</i>), 2,679 individuals representing at least 2.7% of the wintering Iceland/UK/Ireland population Pink-footed Goose (<i>Anser brachyrhynchus</i>), 139 individuals representing <0.1% of the wintering Eastern Greenland/Iceland/UK population Redshank (<i>Tringa totanus</i>), 1,690 individuals representing at least 1.1% of the wintering Eastern Atlantic - wintering population</p> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A wetland of international importance Over winter, the area regularly supports 20,250 individual waterfowl including: Pink-footed Goose (<i>Anser brachyrhynchus</i>), Dunlin (<i>Calidris alpina alpina</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Red-breasted Merganser (<i>Mergus serrator</i>), Velvet Scoter (<i>Melanitta fusca</i>), Common Scoter (<i>Melanitta nigra</i>), Long-tailed duck (<i>Clangula hyemalis</i>), Wigeon (<i>Anas penelope</i>), Redshank (<i>Tringa totanus</i>), Greylag Goose (<i>Anser anser</i>), Bar-tailed Godwit (<i>Limosa lapponica</i>).</p>
Ramsar	Moray and Nairn Coast	8447	<p>Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Pink-footed goose (<i>Anser brachyrhynchus</i>), non-breeding Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Birds - aggregations of non-breeding birds: Waterfowl assemblage, non-breeding Birds - aggregations of non-breeding birds: Redshank (<i>Tringa totanus</i>), non-breeding Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Intertidal mudflats and sandflats Supralittoral sediment (Coast): Sand dune Supralittoral sediment (Coast): Shingle</p>

Designation	Site Name	Site Code	Designating features and comments
Draft SPA	Moray Firth		Qualifying bird species in the Moray Firth marine dSPA Annex 1 species: Great northern diver Red-throated diver Slavonian grebe Migratory species: Scaup Common eider Long-tailed duck Common scoter Velvet scoter Common goldeneye Red-breasted merganser European shag
SAC	Moray Firth	8327	Annex II species that are a primary reason for selection of this site: Bottlenose dolphin (<i>Tursiops truncatus</i>) The Moray Firth supports the only known resident population of bottlenose dolphin <i>Tursiops truncatus</i> in the North Sea. The population is estimated to be around 130 individuals (Wilson et al. 1999). Dolphins are present all year round, and, while they range widely in the Moray Firth, they appear to favour particular areas.
SSSI	Morrich More	1188	Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Birds - aggregations of non-breeding birds: Teal (<i>Anas crecca</i>), non-breeding Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Birds - aggregations of non-breeding birds: Curlew (<i>Numenius arquata</i>), non-breeding Birds - assemblages of breeding birds: Breeding bird assemblage Geomorphology: Coastal Geomorphology of Scotland Littoral sediment (Coast): Saltmarsh Other invertebrates: Invertebrate assemblage Supralittoral sediment (Coast): Sand dunes Vascular plants: Vascular plant assemblage
SSSI	Mound Alderwoods	1202	Birds - assemblages of breeding birds: Breeding bird assemblage Broad-leaved, mixed and yew woodland: Wet woodland Inshore sublittoral sediment (Marine): Saline lagoon
Ramsar	Muir of Dinnet	8448	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding

Designation	Site Name	Site Code	Designating features and comments
SSSI	Munlochy Bay	1214	Birds - aggregations of non-breeding birds: Wigeon (<i>Anas penelope</i>), non-breeding Birds - aggregations of non-breeding birds: Greylag goose (<i>Anser anser</i>), non-breeding Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Mudflats
SPA	North Caithness Cliffs	8554	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season • Peregrine (<i>Falco peregrinus</i>), 6 pairs representing at least 0.5% of the breeding population in Great Britain Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season • Guillemot (<i>Uria aalge</i>), 26,994 pairs representing at least 1.2% of the breeding East Atlantic population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance • During the breeding season, the area regularly supports 110,000 individual seabirds including: Puffin (<i>Fratercula arctica</i>), Razorbill (<i>Alca torda</i>), Kittiwake (<i>Rissa tridactyla</i>), Fulmar (<i>Fulmarus glacialis</i>), Guillemot (<i>Uria aalge</i>).
SPA	North Sutherland Coastal Islands	8559	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance, over winter: Barnacle Goose (<i>Branta leucopsis</i>), 631 individuals representing at least 2.3% of the wintering population in Great Britain (4 year peak mean, 1992/3-1995/6)
SSSI	Ousdale Burn	1262	Broad-leaved, mixed and yew woodland: Upland birch woodland
SAC	River Oykel	8363	Annex II species that are a primary reason for selection of this site: Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) Annex II species present as a qualifying feature, but not a primary reason for selection of this site: Atlantic Salmon (<i>Salmo salar</i>)
SPA	Priest Island (Summer Isles)	8567	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance during the breeding season: Storm Petrel (<i>Hydrobates pelagicus</i>), 2,200 pairs representing at least 2.6% of the breeding population in Great Britain (Count, as at 1995)
SSSI	Reisgill Burn	1344	Broad-leaved, mixed and yew woodland: Scrub
SAC	River Spey	8365	Annex II species that are a primary reason for selection of this site: Fish: Sea lamprey (<i>Petromyzon marinus</i>) Fish: Atlantic salmon (<i>Salmo salar</i>) Mammals: Otter (<i>Lutra lutra</i>) Other invertebrates: Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)

Designation	Site Name	Site Code	Designating features and comments
SSSI	River Spey	1699	Fish: Sea lamprey (<i>Petromyzon marinus</i>) Fish: Atlantic salmon (<i>Salmo salar</i>) Mammals: Otter (<i>Lutra lutra</i>) Other invertebrates: Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)
Ramsar	River Spey - Insh Marshes	8452	Ramsar Site Qualifying Feature category and Features: Birds - aggregations of non-breeding birds: Whooper swan (<i>Cygnus cygnus</i>), non-breeding Birds - assemblages of breeding birds: Breeding bird assemblage Fen, marsh and swamp (Wetland): Flood-plain fen Rivers and streams: Trophic range river/stream Standing open water and canals: Mesotrophic loch
SSSI	Rosemarkie to Shandwick Coast	1376	Birds - aggregations of breeding birds: Cormorant (<i>Phalacrocorax carbo</i>), breeding Broad-leaved, mixed and yew woodland: Upland birch woodland Palaeontology: Mesozoic Palaeobotany Stratigraphy: Callovian Structural and metamorphic geology: Moine Supralittoral rock (Coast): Maritime cliff Supralittoral sediment (Coast): Sand dunes Vascular plants: Purple oxytropis (<i>Oxytropis halleri</i>)
SSSI	Shielton Peatlands	1426	Birds - assemblages of breeding birds: Breeding bird assemblage Bogs (Upland): Blanket bog
NC MPA Proposal	Southern Trench		Southern Trench NC MPA proposal has been proposed for the following Biodiversity features: Burrowed mud , Fronts, Minke whale, Shelf deeps.
SSSI	Spey Bay	1461	Broad-leaved, mixed and yew woodland: Wet woodland Butterflies: Small blue (<i>Cupido minimus</i>) Butterflies: Dingy skipper (<i>Erynnis tages</i>) Fen, marsh and swamp (Wetland): Hydromorphological mire range Geomorphology: Coastal Geomorphology of Scotland Littoral sediment: (Coast) Saltmarsh Supralittoral sediment (Coast): Shingle Vascular plants: Vascular plant assemblage
SSSI	Spinningdale Bog	1462	Fen, marsh and swamp (Wetland): Valley fen

Designation	Site Name	Site Code	Designating features and comments
SSSI	Strath Carnaig and Strath Fleet Moors	9188	Birds - aggregations of breeding birds: Hen harrier (<i>Circus cyaneus</i>), breeding
SSSI	Tarbat Ness	1519	Geomorphology: Coastal Geomorphology of Scotland Stratigraphy: Non-marine Devonian Supralittoral rock (Coast): Maritime cliff
SPA	Tips of Corsemaul and Tom Mor	8584	Article 4.2 qualification of the Directive (79/409/EEC) supporting populations of European importance migratory species, during the breeding season: Common Gull (<i>Larus canus</i>), 18,000 pairs representing at least 14.5% of the breeding West and Central Europe population (1998).
SSSI	Tore of Troup	1547	Broad-leaved, mixed and yew woodland: Upland mixed ash woodland Broad-leaved, mixed and yew woodland: Upland birch woodland Mosaic: Upland assemblage
SPA	Troup, Pennan and Lion's Heads	8587	Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season: Guillemot <i>Uria aalge</i> , 29,902 pairs representing at least 1.3% of the breeding East Atlantic population Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance During the breeding season, the area regularly supports 150,000 individual seabirds including: Razorbill (<i>Alca torda</i>), Kittiwake (<i>Rissa tridactyla</i>), Herring Gull (<i>Larus argentatus</i>), Fulmar (<i>Fulmarus glacialis</i>), Guillemot (<i>Uria aalge</i>).
SPA	Wester Ross Lochs	8590	Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: During the breeding season: Black-throated Diver (<i>Gavia arctica</i>), 8 pairs representing at least 5.0% of the breeding population in Great Britain
SSSI	Whiteness Head	1633	Birds - aggregations of non-breeding birds: Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding Birds - aggregations of non-breeding birds: Knot (<i>Calidris canutus</i>), non-breeding Geomorphology: Coastal Geomorphology of Scotland Littoral sediment (Coast): Saltmarsh Littoral sediment (Marine): Sandflats Supralittoral sediment (Coast): Sand dunes Supralittoral sediment (Coast): Shingle

A.2.2 Protected Species

European Protected Species (EPS)

EPS are those species listed on Annex IV of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive). They require “a system of strict protection”. In Scotland the Habitats Directive is transposed through a combination of the Conservation of Species and Habitats Regulations 2010 (in relation to reserved matters) and The Conservation (Natural Habitats, &c.) Regulations 1994. For UK offshore waters the Habitats Directive is transposed into UK law by the Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007 (as amended). The regulations make it an offence to deliberately capture, injure, kill or disturb any listed animal. Disturbance of animals includes activities that are likely to –

- a) to impair their ability –
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) in the case of animals of a migratory species, to migrate
- b) to affect significantly the local distribution or abundance of the species to which they belong

Marine EPS include:

- All cetaceans (dolphins, porpoises and whales);
- Otters (*Lutra lutra*);
- Sturgeon fish (*Acipenser sturio*), and
- Marine turtles (*Caretta caretta*, *Chelonia mydas*, *Lepidochelys kempii*), *Eretmochelys imbricate*, *Dermochelys coriacea*).

Cetaceans and otters are found within the study area, further details of which are provided in individual sections below.

Cetaceans

All cetaceans occur on Annex IV of the Habitats Directive and therefore require strict protection.

The Moray Firth is particularly important for Cetaceans and is famous as the home to one of only two known resident populations of bottlenose dolphin (*Tursiops truncatus*) in UK waters. The Moray Firth population is internationally important being the most northerly population of bottlenose dolphins in the world and is the most important population within the North Sea. They are protected by the Moray Firth SAC which covers an area of 1,513 km² and includes parts of the Cromarty Firth. The population consists of about 130 animals. The individuals of this population spend the majority of the year in and around the Moray Firth, and of this population, over 60% are regularly found in and around the Sutors, although individuals have been known to travel as far as Berwick-upon-Tweed on occasions (Moray Firth Partnership, 2011a; 2011b; SNH 2009).

There are eight other cetacean species which are known to occur within the Moray Firth. Regularly occurring species include: harbour porpoises (*Phocoena phocoena*), white beaked dolphins (*Lagenorhynchus albirostris*) and minke whales (*Balaenoptera acutorostrata*). Harbour porpoise and white

beaked dolphin are regularly sighted in coastal waters although are also found offshore. Minke whale are regularly present offshore although can be seen close inshore around the Sutors, and tend to enter the Firth during the autumn months of September to early November. The remaining species, which are occasional visitors to the Moray Firth, are: the Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long finned pilot whale (*Globicephala melas*), short-beaked common dolphin (*Delphinus delphis*), killer whale (*Orcinus orca*) and the Risso's dolphin (*Grampus griseus*) (Reid *et al* 2003; CPFA, 2012; Moray Firth Partnership, 2011a).

Species known to visit the Cromarty Firth include harbour porpoise, white-beaked dolphin, Risso's dolphin and killer whale (Intertek, 2015).

Otters

The European otter is an EPS, listed on Annex IV of the Habitats Directive. It is also listed on Annex II of the Habitats Directive requiring the designation of SACs for its conservation. Otters are semi-aquatic mammals that obtain most of their food from lochs, rivers or the sea. The Scottish population is unusual in that it comprises a particularly high proportion (50% or more) of coastal dwelling otters which feed predominantly in the sea (SNH 2008, 2013).

The European otter (*Lutra lutra*) was once widespread in Europe, but numbers declined sharply in the 1960s and 70s due to pollution, exacerbated by habitat loss and hunting (JNCC, 2013). In Great Britain, whilst numbers fell in England and Wales, they survived in Scotland's cleanest water bodies in the north and west, and Scotland has remained a European stronghold for otters. In 2003, the total Scottish population was estimated at around 8,000 (SNH, 2013).

Whilst the most important coastal areas for otters in the British Isles are the west coast of Scotland and the Shetland Islands, one SAC in the study area, Dornoch Firth and Morrich More SAC, lists otters as an interest or a qualifying feature. This site consists of an estuarine system with extensive areas of bordering natural habitat including sand dune, woodland and small lochans. The area supports a good population of otters in what is the only east coast estuarine site selected for the species in Scotland (<http://jncc.defra.gov.uk>).

Other Protected Species

In addition to these EPSs, Annex II of the Habitats Directive lists animal and plant species of community interest whose conservation requires the designation of SACs. Annex II species which occur regularly in the study area include:

- Bottlenose Dolphin (*Tursiops truncatus*)
- Otter (*Lutra lutra*)
- Common seal (*Phoca vitulina*)
- Grey seal (*Halichoerus grypus*)

Annex II species for which SACs have been designated in the study area include:

- Bottlenose Dolphin (*Tursiops truncatus*)
- Otter (*Lutra lutra*)
- Common seal (*Phoca vitulina*)

Seals

Two species of seals live and breed in UK waters: grey seals (*Halichoerus grypus*) and common (harbour) seals (*Phoca vitulina*). Both species are listed under Annex II of the EC Habitats Directive which lists animal and plant species of community interest whose conservation requires the designation of SACs. In Scotland, the Marine (Scotland) Act 2010 provides for improved protection of seals by making it an offence to kill or take seals at any time. The Act allows exceptions only under specific licence or for animal welfare, and introduces a new offence of harassment of seals at listed haul-out sites. Both grey seals and common seals are listed on the recommended Priority Marine Features (PMF) in Scotland's seas.

Grey seals

Approximately 38% of the world's grey seals breed in the UK and 88% of these breed at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney. Although numbers of grey seal pups have steadily grown since the 1960s, there is clear evidence that the population growth has levelled off).

Grey seals forage in the open sea and return regularly to haul out sites where they rest, moult and breed. Foraging trips can last between 1 and 30 days during which they may range widely, often travelling over 100km between haul out sites. Grey seals in the UK spend longer times hauled out than other times of the year during their annual moult (between December and April) and during their breeding season (between August and December). In the UK, grey seals typically breed on remote uninhabited islands or coasts and in small numbers in caves (SCOS, 2014).

Grey seals are more numerous on Scotland's north and west coasts but some breed in the outer Moray Firth. Up to 500 grey seals come into the Moray Firth in the summer and more than 300 grey seals have been counted on sandbanks in the Dornoch Firth in summer. The majority of haul-out sites for grey seals are in the Dornoch Firth. There are only two sites on the Scottish mainland where grey seals are known to breed, one of which is in the Moray Firth on a stretch of coastline near Helmsdale (Moray Firth Partnership, 2007b).

Common (harbour) seal

The common seal is in fact less common than grey seals in British waters, at about 55,000 compared with around 120,000 grey seals (The Mammal Society, 2014). Common seals are divided into five sub-species. The population in European waters represents one sub-species (*Phoca vitulina vitulina*).

Approximately 30% of European common seals are found in the UK; this proportion has declined from approximately 40% in 2002. 79% of the UK population is found in Scotland. Common seals are widespread around the west coast of Scotland, throughout the Hebrides and Northern Isles. They are more restricted on the east coast of Scotland with concentrations in the major estuaries of the Firth of Tay and the Moray Firth.

Recent figures show that common seal numbers around Scotland as a whole are declining. Major declines have been documented in several Scottish populations with declines since 2001 of 76% in Orkney, 30% in Shetland between 2000 and 2009, and 92% between 2002 and 2013 in the Firth of Tay. However, although there was a decline in the Moray Firth by 50% before 2005,

the population remained fairly stable for four years and then increased by 40% to 2010 and has fluctuated ever since (SCOS, 2014).

The Moray Firth is home to over 1,500 common seals. Common seals may be seen hauled out on sand banks between Brora Bay and Findhorn Bay and on remote rocky shores (Moray Firth Partnership, 2007b).

Distribution information on common seals is mainly based on observations at haul-out sites. Most the haul-out sites within the Moray Firth are in the inner Moray Firth, either on intertidal sandbanks or mudflats connected to the shore at low tide. There are over 20 haul-out sites in the inner Moray Firth and these are found in the Beaully, Inverness, Cromarty and Dornoch Firth, with small groups on sites such as Loch Fleet and Findhorn bay (Moray Firth Partnership, 2007b).

There is one SAC designated for seals in the study area; Dornoch Firth and Morrich More SAC, for which common seals are a primary reason for selection of this site. It should be noted that the common seals which use the Cromarty Firth are likely to form part of the population in the wider Moray Firth and particularly the Dornoch Firth where they are a qualifying feature of the Dornoch Firth and Morrich More SAC.

Summary of Protected Species

A summary of the SACs in the area which list an Annex IV (EPS) or Annex II species as an interest or qualifying feature are summarised in Table A-2.

Table A-2: SACs in the study area which list an Annex IV (EPS) or Annex II species as a primary or qualifying interest feature

Site name	Annex IV species	Annex II species
Dornoch Firth and Morrich More	Otter	Common seal Otter
Moray Firth	Bottlenose Dolphin	Bottlenose Dolphin

A.2.3 Birds

The Inner Moray Firth is the most northerly extensive estuarine complex in Europe and is recognised as internationally important for wintering water birds (divers, grebes, swans, geese, ducks and waders) due to its geographic position. It is also a vital part of the North Atlantic Flyway (bird migration route that generally follows the Atlantic Coast of North America), being an important staging site in spring and autumn for wildfowl and waders migrating between their breeding grounds in Canada, Greenland, Iceland, the Faroes, Orkney, Shetland, Scandanavia and Russia and their more temperate wintering grounds in western Europe and, for some species, West Africa. In an average winter, the inner Moray Firth supports over 130,000 waterfowl, with many more using the area for a brief period whilst on migration (Moray Firth Partnership, 2011a).

The Cromarty Firth's sheltered bays, intertidal flats and saltmarshes provide roosting and feeding grounds for wintering wildfowl and waders which regularly reach numbers in excess of 29,000 birds. The estuary supports internationally important populations of four species of waterfowl: Icelandic Greylag Goose (*Anser anser*), Redshank (*Tringa totanus*), Wigeon (*Anas penelope*), and Bar-

tailed Godwit (*Limosa lapponica*) and nationally important populations of a further four species: red-breasted merganser (*Mergus serrator*), goldeneye (*Bucephala clangula*), curlew (*Numenius arquata*), and scaup (*Aythya marila*). In addition birds present in smaller numbers include Slavonian grebe (*Podiceps auritus*), whooper swan (*Cygnus cygnus*), teal (*Anas crecca*), oystercatcher (*Haematopus ostralegus*) and pink footed geese (*Anser brachyrhynchus*). These waterfowl form major components of the internationally important populations of these species which over winter in the Moray Firth as a whole (Moray Firth Partnership, 2007a).

In the summer months the cliffs around the Moray Firth are important to thousands of seabirds such as gulls, guillemots, puffins, kittiwakes, fulmars and gannets, which come to nest on the cliffs and rear their young. Sea birds spend a significant part of their lives out at sea, many only return to the land to breed. Cliffs offer sea birds ideal nesting sites, being close to fishing grounds but also relatively safe from terrestrial predators (Moray Firth Partnership, 2011c).

A range of breeding birds occur in the Cromarty Firth, including colonies of herring gull, fulmar, common gull and greater black backed gull (Moray Partnership 2007). The complex of sea cliffs and stacks at North Sutor by Nigg in particular, provides an important breeding space for many seabirds. Most notably this includes the largest breeding group of cormorants in eastern Britain and third largest in Scotland. Other breeding seabirds here include fulmar, shag, kittiwake, herring gull, great black-backed gull, guillemot and razorbill. Elsewhere along the hard coastline, breeding seabirds are very few and principally restricted to fulmar and gulls (Ross & Cromarty (East) Biodiversity Group, 2004).

In addition, the Cromarty Firth is of particular importance for approximately 300 pairs of breeding terns which nest in the Alness and Nigg areas. The saltmarshes support small numbers of breeding waders including oystercatcher, redshank, and lapwing. Small numbers of ringed plover also breed within the estuary. The estuary also provides foraging grounds for nationally important numbers of breeding osprey (Moray Firth Partnership, 2007a).

Sea bird Vulnerability

Seabirds are vulnerable to surface oil pollution, which can poison them through ingestion, or cause hypothermia by preventing them from waterproofing their feathers. Birds are most vulnerable to oil pollution when they are moulting, because they can become flightless and spend a long time on the water surface (Talisman Energy, 2002).

Seabirds in the inner Moray Firths are very vulnerable to oil pollution in the area throughout the year:

- In winter the Moray Firth is locally important to divers and seaducks, species which are vulnerable to pollution through prolonged periods of contact with the water surface (Stone *et al*, 1995).
- During spring and autumn the sheltered Dornoch, Cromarty and Inner Moray Firths are important for migrating waders and wildfowl.
- During the breeding season (April to June) high numbers of seabirds are concentrated at breeding sites and the coastal waters. Many seabirds disperse into the offshore waters at the end of the breeding season.

- In late summer/autumn the inner Moray Firths provide ideal conditions for several species of both resident and migratory birds to moult (Moray Firth Partnership, 2011a).

A.2.4 Fish

The seas around Scotland support significant populations of commercially important species of fish and shellfish. Fishing targets both demersal and pelagic stocks (Scottish Government, 2015). The distributions of these stocks and their species are mainly governed by two partially inter-related factors, depth and the physical nature of the seabed.

The fisheries in the Moray Firth are an important food source for the sea birds and marine mammals of the Firth. They are also a natural resource which has played an important role in the economic and social development of the area (Moray Firth Partnership, 2007c).

The Centre for Environment, Fisheries and Aquaculture Science (Cefas) provide information on spawning grounds (the location where eggs are laid) and nursery areas (the location where juveniles are common) for fish stocks in the region in the format of fisheries sensitivity maps. The Cromarty Firth and surrounding waters of the Moray Firth are located in a region important for a number of commercially important fish species. The area is a spawning and nursery ground for herring (*Clupea harengus*), whiting (*Merlangius merlangus*), plaice (*Pleuronectes platessa*), lemon sole (*Microstomus Kitt*), sandeels, sprat (*Sprattus sprattus*) and Norway lobster (*Nephrops norvegicus*); it is a spawning ground for cod (*Gadus morhua*) and a nursery ground for haddock (*Melanogrammus aeglefinus*) and saithe (*Pollachius virens*) (Coull *et al.*, 1998).

Over the years marine fisheries have declined in the Firth through over-exploitation, reducing the productivity of this ecosystem (SNH 2002). For example, herring were the mainstay of the Scottish fishing industry from the 1900's to the 1960's. However, herring declined drastically in the North Sea from the 1950's leading to the closure of the fishery between 1977 and 1983 (Moray Firth Partnership, 2011d).

Shellfish and Aquaculture

Today the most important source of income from commercial fishing in the Firth is from shellfisheries. £22 million worth of shellfish is landed annually from the Moray Firth, much of which is exported. Norway lobster (*Nephrops*) is now the most important commercial fishery in the Firth (Moray Firth Partnership, 2011e). Other commercially exploited shellfish species in the Moray Firth include lobster, edible crabs, whelks, razorfish, cockles and mussels (Moray Firth Partnership, 2007d).

There are two active licensed finfish farms located within the inner Moray Firth, just inside the entrance to the Cromarty Firth. There are also a number of active shellfish sites within the Cromarty Firth and one within Dornoch Firth. Part of Cromarty Firth and Dornoch Firth are classified as shellfish harvesting areas.

The Common Mussel (*Mytilus Edulis*) is found in many places in the Moray Firth. They can form huge beds particularly in areas where conditions are good for larval settlement, and where there is plenty of food. The largest wild mussel fishery in Scotland is in the Dornoch Firth (Moray Firth Partnership, 2011e).

There is an extensive cockle resource in Nigg Bay, which traditionally was harvested by local people by hand. More recently, the beds have attracted commercial cockle collectors who have used either a boat operated suction dredge or land based tractor drawn dredges. Such activities have raised concerns because of the impact on the intertidal habitat and disturbance to the wintering bird populations. As a result of commercial cockle collection from Nigg Bay in the early 1990s, the Secretary of State (at SNH's request) granted a Nature Conservation Order for Nigg and Udale Bays which was confirmed in 1996. This prohibits mechanical harvesting (Halcrow Group Limited, 2009).

A.2.5 Habitats and Benthic Communities

The Cromarty Firth is a relatively large estuary which supports a range of estuarine habitats including sand and mud flats, shingle banks, saltmarsh, mussel beds and coastal lagoons (The Highlands Council 2009). The conservation importance of these habitats is reflected in the designation of the Cromarty Firth SSSI and Lower River Conon SSSI. Habitats the Cromarty Firth SSSI has been notified as a SSSI for include its intertidal sand and mud flats, saltmarsh and coastal lagoons (Halcrow Group Limited, 2009) and the Lower River Conon SSSI has been notified in part for its saltmarsh habitat (SNH, 2015).

Within the Cromarty Firth a linear deep-water channel extends westwards from the narrow entrance at Cromarty almost as far as Alness. To the north and south of this lie the wide shallow bays of Nigg and Udale respectively, which, together with the inner bays at Alness and Dingwall, include approximately 4,000 hectares of tidal sand and mud flats. This is the largest extent of flats within the Moray Firth Basin and supports a rich and abundant invertebrate fauna. These, together with the extensive communities of pioneer plant species such as glasswort *Salicornia* spp, eelgrass *Zostera* spp and tasselweed (*Ruppia maritima*, provide the food resource for large numbers of over wintering wildfowl and waders (The Highlands Council, 2009).

Littoral Zone Habitats and Communities

The uppermost parts of the Cromarty Firth are muddy but give way to predominantly sand towards the mouth at Nigg and Udale Bays. These sands and mud flats support a rich and abundant invertebrate faunal community. (Halcrow Group Limited, 2009).

The Cromarty Firth has one of the best examples of seagrass beds, a UK Biodiversity Action Plan (UKBAP) priority habitat, found around the coasts of the British Isles. Seagrass beds develop on sands and muds and are typically found in sheltered marine inlets and bays, lagoons and channels.

The main components of the habitat are eelgrass species. The Cromarty Firth supports what is most probably the largest total area of dwarf eelgrass and narrow leaved eelgrass in Britain (approximately 1200 ha). Eelgrass is important as a food resource for wildfowl and is an important nursery area for some fish and other marine animals (ALGE 2011). Within the Cromarty Firth, both Nigg and Udale bays have extensive seagrass beds, typified by an eelgrass/tasselweed/spireshell (*Zostera/Ruppia/Hydrobia* sp.) association. There are also wide areas of salt marsh around Dingwall Bay and on the Conon Islands which comprise glasswort/tasselweed/eelgrass

(*Salicornia/Ruppia/Zostera* sp.) and are of considerable ecological importance (Intertek, 2015).

The invertebrate fauna of the lower Cromarty Firth is, in general, rich compared to many intertidal flats in northeast Scotland. In the upper Cromarty Firth there are smaller areas of intertidal sands and muds in distinctly estuarine conditions which are classed as “very-sheltered shores”.

The intertidal sand and mud flats of the shores at both Nigg and Udale Bays are dominated by lugworm (*Arenicola marina*) communities in the mid shore levels, and below, with the most important species in terms of biomass being mussel (*Mytilus edulis*), lugworm, spireshell (*Hydrobia ulvae*), Baltic tellin (*Macoma balthica*) and cockle (*Cerastoderma edula*). Cromarty Firth’s soft shores appear to be rich in numbers of bivalve species but poor in number of individuals and number of species of oligochaetes (segmented worms). This is thought to be due to the sandy, relatively silt-free sediment. Extensive mussel beds are found in both Nigg and Udale Bays. The Nigg Bay mussel beds are confined to the west and middle parts of the bay and Udale flats are flanked by mussel beds on the scoured channel edge at Newhall Point (Intertek, 2015).

At the entrance to Cromarty Firth, the rocky shores of the North and South Sutor headlands provide examples of slightly sheltered shores whilst those of Balintraid Pier, Invergordon are classed as sheltered rocky shores. Generally, the slightly sheltered shores have upper-shore furoid stands, a well-developed mid-shore barnacle zone and a low shore zone or red turf-forming alga with associate amphipods and isopods. Additionally, abundant grazing populations of littorinids and limpets are common in the mid-shore.

On most of the sheltered bedrock shores there is a small uppermost zone of channelled wrack seaweed *Pelvetia canaliculata* and a fairly well developed zone of flat wrack seaweed *Fucus Spiralis* below this, but these are both absent or patchy and ill-defined on the shingle shores. Mid-shore furoid stands are present, being replaced by the laminarians at low-shore. Littorinids and limpets are common, but there are no dominant barnacle populations on the sheltered shores (Intertek, 2015).

Sub-tidal Zone Habitats and Communities

The typically sandy sediment at Invergordon within Cromarty Firth is dominated by the bivalves *Fabulina fabula* and *Gari fervensis*. Further seawards the seabed consists of mud with scattered boiler clinker (ash and partially fused residues from a coal-fired furnace) and a fauna characterised by the bivalve *Abra Alba*. At the narrow entrance to the Firth, where strong tidal currents and firmer, sandier sediments are present, the recorded species include the polychaete worms *Ophelia borealis*, *Aonides oxycephala*, *Glycera capital*, *Prionosplo cirrifera*, *Microphthalmus* sp. and *Nephtys longosetosa* and the amphiod *Atylus falcatus*. East of the entrance to the Firth the diversity of species has been recorded as lower than within the Firth. The seabed below the STS locations is sand and muddy sand.

In May 1992, A Marine Nature Conservation Review (MNCR) sub littoral survey was carried out between the North and South Sutors at the entrance to the Cromarty Firth. The results indicate a more diverse, but not unusual fauna, including hydroids and anemones. A richer epifauna was recorded on sandy mud east of old Shandwick. During additional survey work in the deep water

channels west of the Sutors extensive beds of horse mussel (*Modiolus modiolus*) a UKBAP priority habitat, were discovered (Intertek, 2015).

A.2.6 Non-Native Species

Marine species and plants and algae transported from their native range to 'new' areas are called non-native species (NNS) (sometimes referred to as alien or invasive species). Species can be introduced to non-native environments accidentally or deliberately. Introductions and transfer of non-native marine species to their non-native environment mainly occurs by the transport and discharge of ballast water, and to a lesser extent by transport of fouling organisms on hulls or through aquaculture.

Once established in a new region, NNS may invade new areas adjacent to the occupied area by natural dispersal, e.g. via transport in water currents in the case of many seaweeds and phytoplankton.

NNS may displace native organisms by preying on them or out-competing them for resources such as for food, space or both. In some cases this has led to the elimination of indigenous species from certain areas. Occasionally, NNS can reproduce with native species and produce hybrids, which will alter the genetic pool (a process called genetic pollution), which is an irreversible change. When an invasive species has established itself in the marine environment, it can be extremely difficult to control and eradicate an invasive species in the marine environment. It is therefore easier and preferable to prevent the arrival of NNS.

In Scotland, there is a recognised growing problem with marine invasive NNS (SNH, 2014) and there are a number of NNS already noted as being present in Scottish waters. SNH acknowledges that few of these are invasive, but there are a number that have become widespread and well established, including:

- Green sea fingers (*Codium fragile* subsp. *tomentosoides*)
- Common cord grass (*Spartina anglica*)
- A red alga (*Heterosiphonia japonica*)
- Wireweed (*Sargassum muticum*)
- Acorn barnacle (*Elminius modestus*)
- Japanese skeleton shrimp (*Caprella mutica*)
- Leathery sea squirt (*Styela clava*)
- Carpet sea squirt (*Didemnum vexillum*)

SNH also notes that there are some examples of species that are in, or close to the British Isles but have yet to reach Scotland:

- Chinese Mitten crab (*Eriocheir sinensis*)
- Slipper limpet (*Crepidula fornicata*)

Within the Cromarty Firth, the NNS common cord-grass (*Spartina anglica*) is present.

The smooth cord grass *Spartina alterniflora* was first introduced to the Britain from North America prior to 1870 and its subsequent crossing with the native small cord grass *S. maritima* resulted in the appearance of the common cord grass *S. anglica*. It is thought that *Spartina alterniflora* was originally introduced

in ships' ballast water. Following the appearance of *Spartina anglica*, it was extensively planted throughout Britain to stabilise soft sediments.

The main concern regarding environmental effects in areas such as the Cromarty firth are that rapid colonisation of *Spartina* over extensive flats in sites with large wintering populations of waders and wildfowl can result in the birds' loss of habitat for feeding and roosting. Additionally, displacement of the native *S. maritima* can alter the course of succession, producing a monoculture of low intrinsic value. Amenity interests may also be affected (Eno *et al*, 1997).

A.3 Human Beings

A.3.1 Quality of Life

The Highlands has amongst the highest life expectancy in Scotland. Life expectancy in the Highlands for both males and females is higher than the Scottish average. In 2013, female life expectancy at birth (82.2 years) is greater than male life expectancy (77.7 years) (National Records of Scotland, 2014a).

The estimated population for the Highlands was 232,950 for 2013 (National Records of Scotland, 2014a). The population accounts for 4.4 per cent of the total population of Scotland. Settlements with the area surrounding the Cromarty Firth and their population are presented in Table A-3.

Table A-3: Population by settlement (Source: 2011 Census settlement populations and the Highland Council)

Settlement	Population
Inverness	61,235
Nairn	9,773
Alness	5,782
Dingwall	5,491
Invergordon	4,075
Tain	3,655
Conon Bridge and Maryburgh	3,147
Muir of Ord	2,428

The Highlands make up one third of the land area of Scotland including a number of remote and sparsely populated parts. Population density across the Highlands region was 9.1 person per/km² in 2013 (National Records of Scotland, 2014b). The sub-regions of Inverness, Ross and Cromarty and Nairn which surround the study area are more densely populated as shown on Table A-4.

TableA-4: Population Density (National Records of Scotland, 2014b)

Sub-region	Population density
Inverness	26.8
Ross and Cromarty	10.6
Nairn	30.6

Since 1987, Highland's total population has risen overall. In recent years there has been a net inflow of migration into the area (National Records of Scotland, 2014).

An oil spill has the potential to adversely impact quality of life through impacts on employment, recreation, water quality and the local economy.

A.3.2 Recreation

The Cromarty Firth has been an important source of recreation for local people for centuries. A wide range of recreation activities are practised such as wildfowling, boating, walking, bird watching and fishing. Bottlenose dolphins are regularly seen at the mouth of the firth and are now a major tourist attraction. In addition, the wide range of bird life in the Firth attracts many bird watchers (Halcrow Group Limited, 2009).

The close proximity of sea, coast and land provides for a diverse range of activities with opportunities for tourism and outdoor recreation (SNH, 2002). There are a number of recreational sailing routes in the area. The Cromarty Firth and lower Moray Firth is identified by the Royal Yachting Association as a sailing area (RYA, 2013). There are also a number of training centres and sailing clubs, such as those located at Invergordon, Nairn, Fortrose and Cromarty. There are also a number of recreational dive locations within the lower Moray Firth and nearby Nairn is a windsurfing location.

A.3.3 Employment

Within the Highland region 104,700 people are employed, with 63% of people working full time (ONS, 2013). The main industries in the Inner Moray Firth region are health and social work, wholesale and retails, followed by construction.

PoCF employs approximately 22 full time staff members. The Invergordon Service Base supports job creation and creates employment opportunities both directly and indirectly for the companies that operate from the Port's engineering hub. At peak periods this employment figure can be as high as 1,500 (CFPA, 2013).

Oil related developments are currently the most significant economically in the area surrounding Cromarty Firth. Developments are mainly connected with the fabrication; maintenance and decommissioning of North Sea oil structures as well as the storage and shipment of oil itself (Halcrow Group Limited, 2009). A wide range of other industries have been developed on the north shore of the Cromarty firth. These range from those serving shipping and the oil industry to distilleries and manufacturing. Increasingly businesses are locating close to the firth because of the clean environment. A business park has been developed close to the shore at Alness and there are simplified planning zones at Invergordon and Alness to encourage development (Halcrow Group Limited, 2009).

A.3.4 Health and Safety

Fatal and major injuries rates per 100,000 employees in Highlands and Scotland are recorded in Table A-5. The results show that Highland generally

has a lower injury rate than Scotland. Overtime while the injury rate in Scotland has decreased over time, the injury rate for Highland has fluctuated.

Table A-5: Fatal and major injuries rates per 100,000 employees (reported to enforcing authorities) (HSE, 2015)

Area	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Scotland	118.2	116.5	113.1	114.5	95.4	88.0	82.7
Highland	118.7	108.6	90.5	88.0	84.3	86.9	89.6

Injuries and accidents reported to PoCF for the period of 2008 to 2014 are shown in Table A-6. This includes accidents reported by Port Users and accidents which have involved PoCF staff. The statistics indicate that injuries to staff and the public are minor. During this period there was only one work-related accident which required reporting under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995).

Table A-6: Accidents reported to PoCF 2008-2014 (CFPA, 2015a)

Type	2008	2009	2010	2011	2012	2013	2014
RIDDOR	1	0	0	0	0	0	0
Minor	1	8	4	3	2	1	9

A.4 Water

A.4.1 Water Quality

Water Framework Directive (WFD) Classification

The WFD aims to prevent deterioration and enhance the status of aquatic ecosystems (including coastal and transitional waters). In Scotland, the WFD is implemented by SEPA. Results for the WFD coastal and transitional classification waters within the area are shown in Table A-7. The results show that while the WFD status of the transitional waters within the Cromarty Firth has remained Good over time, the status of the coastal waters outside the Cromarty Firth has degraded from High to Good. The reduction in the water quality status may be due to diffuse source pollution.

Table A-7: Water Framework Directive Classification (SEPA, 2015)

Waterbody	Type	2010	2011	2012	2013
Inner Cromarty Firth (200443)	Transitional	Good	Good	Good	Good
Outer Cromarty Firth (200442)	Transitional	Good	Good	Good	Good
Hilton of Cadboll to Whiteness Head (200501)	Coastal	High	High	High	Good
Moray Firth – Offshore (200171)	Coastal	High	High	High	Good
Whiteness Head to Burghead (200502)	Coastal	High	High	High	Good

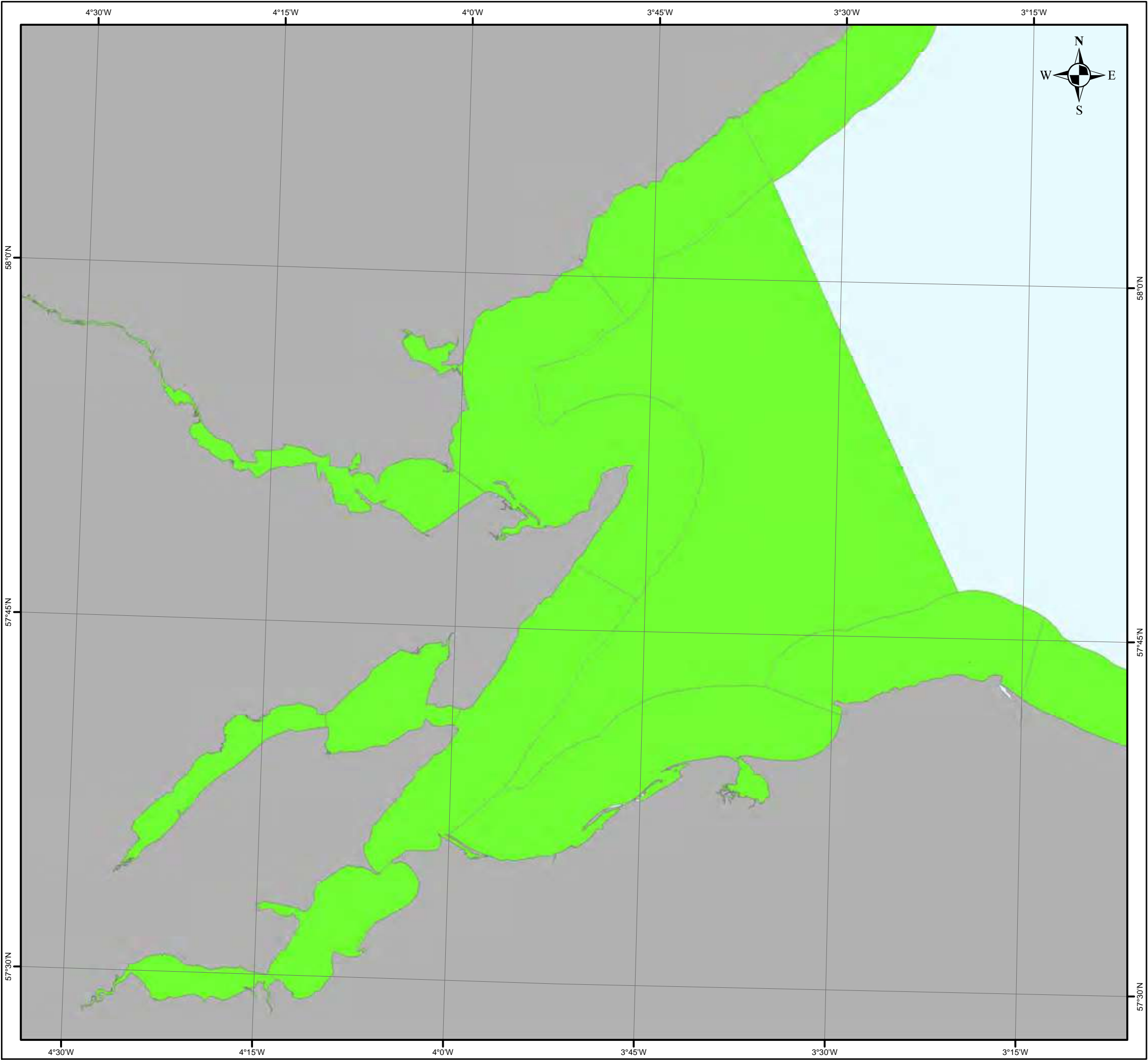
Figure A-7 shows the classification of coastal and transitional waters around Cromarty Firth in 2013 from Helmsdale to Lossiemouth. It shows that the water bodies within the area are achieving Good Classification. Many of these areas have degraded over the past few years.

Bathing Water Quality

The Bathing Waters Directive requires bathing waters to meet water quality standards designed to protect the health of the people who bathe in these waters. There are six bathing waters within the study area. These are shown in Figure A-8. Results from bathing water monitoring for the six bathing waters are shown in Table A-8. The results show that water quality at the bathing waters has fluctuated between Mandatory and Guideline overtime for the majority of the bathing waters. Water quality at Lossiemouth (East) has varied more, with 2011 failing to meet the Guideline standard. Currently all the bathing waters (apart from Dornach) comply with the Mandatory standard for the presence of bacteria in the water, while Dornach complies with the Guideline standard (SEPA, 2014).

Table A-8: Bathing Water Overall Classification (SEPA)

Bathing Water	2010	2011	2012	2013	2014
Dornach	Guideline	Guideline	Guideline	Guideline	Guideline
Rosemarkie	Guideline	Mandatory	Guideline	Guideline	Mandatory
Nairn (Central)	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Nairn (East)	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Findhorn	Guideline	Guideline	Mandatory	Guideline	Mandatory
Lossiemouth (East)	Mandatory	Fail	Mandatory	Guideline	Mandatory



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Figure A-7: Classification of Coastal and Transitional Waters 2013

Legend

Coastal and Transitional Waters Classification 2013

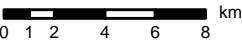
- High
- Good
- Moderate

NOTE: Not to be used for Navigation

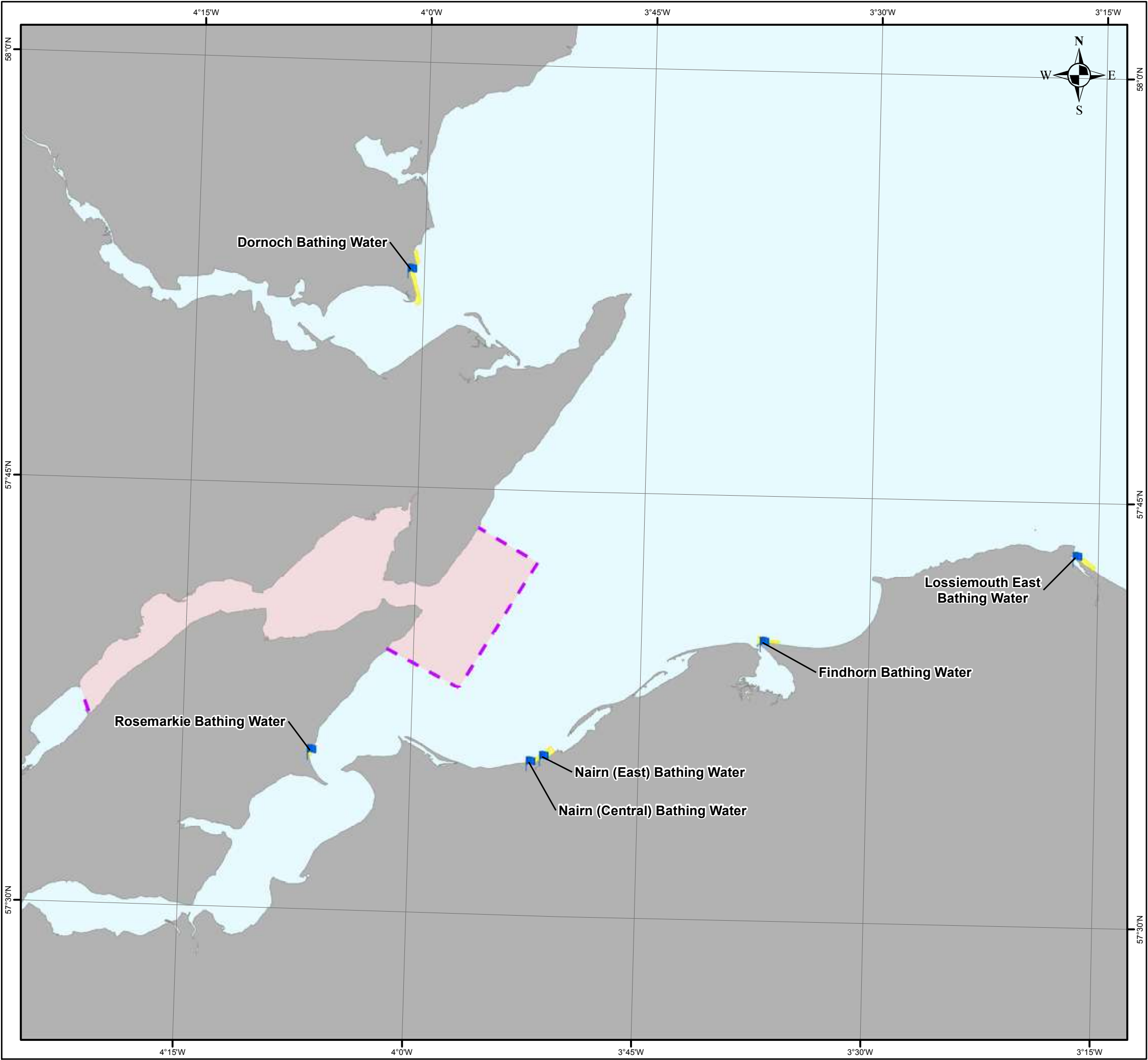
Date	Thursday, May 28, 2015 11:35:34
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	CFPA, OSOD, SEPA
File Reference	J:\P1946\Mxd\Report\Appendix_A\ WFD_Waterbodies.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij



Valued Quality. Delivered.



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Figure A-8: Designated Bathing Waters

Legend

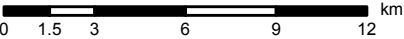
- Cromarty Firth Harbour Limit
- Cromarty Firth Harbour Area
- Designated Bathing Water
- Bathing Water

NOTE: Not to be used for Navigation

Date	Thursday, May 28, 2015 10:54:18
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	CFPA, OSOD, SEPA
File Reference	J:\P1946\Mxd\Report\Appendix_A\Bathing_Waters.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij



Valued Quality. Delivered.



Shellfish Water Quality

The area contains two designated shellfish waters, one in Cromarty Bay and one in Dornoch Firth. Water quality monitoring at Cromarty Bay shellfish water shows that compliance with the guideline faecal coliforms has failed most years between 1999 and 2010. The waters have only complied with guideline standards for faecal coliforms three times since the site was designated in 1998. It has passed in 2004, 2005 and 2008 (SEPA, 2011a). These failures are most likely thought to be caused by diffuse pressure from farming or sewage disposal.

At Dornoch Firth shellfish water, water quality monitoring shows that compliance with the guideline faecal coliforms has failed between 2003 and 2006 (SEPA, 2011b). The sampling site has moved numerous times over this time period. No further sampling data was available.

A.4.2 Marine Pollution

Sources of marine pollution include:

- Industrial wastewater
- Domestic sewage
- Offshore oil
- Farm runoff
- Ballast water
- Litter

Although there have been improvements in quality from surface waters since the 1960s, pollution from point sources, including domestic sewerage and industrial effluents, diffuse run-off from agriculture and urban land and deposition of airborne pollution from industry, agriculture and vehicles have all affected freshwater sources (SNH, 2002). These often reach the marine environment.

The effluent treatment plant at Nigg Oil Terminal treats ballast water before being discharged via a deep water pipeline to the Cromarty Firth (Talisman Energy, 2006). It is not known what this treatment entails. Discharge is governed by a SEPA licence, which covers emissions to the water environment and requirements for sampling, testing and reporting.

Oil rigs stationed within the Cromarty Firth are potential sources of pollution (SNH, 2002), as are fish farms. Distilleries also discharge into both fresh and marine waters.

Statistics for oil and chemical spills resulting from ships and offshore oil and gas installations are discussed in the section below.

A.4.3 Oil and Chemical Pollution

Only one major oil spill incident has occurred in or around northern Scotland since 1993, when the Braer tanker ran aground and spilt 85,000 tonnes of crude oil off the coast of the Shetland Islands. In August 2011, the flow line leading to the Gannet Alpha platform leaked >200 tonnes of oil into the North

Sea, 180 km east of Aberdeen. So far, no major environmental damage has resulted from oil pollution in the Moray Firth.

A number of small incidents, however, do occur each year from ships and offshore oil and gas installations. Figure A-9 shows the total number of incidents of oil and chemical spills between 2002 and 2013. The figures demonstrate that a number of oil and chemical spill incidents occur in the Eastern Scotland area; this is mostly higher than in Western Scotland. This is most likely due to the greater number of oil and gas installations within the surrounding area. Oil spills occurring in coastal waters are usually due to accidents in the handling of oil or due to ships running aground, while most offshore spills occur at oil and gas installations. Over the time period 2002 to 2013 there was an average of 16 oil and chemical spills each year in Eastern Scotland compared to an average of 481 in the UKCS.

It is important to monitor oil and chemical spills as these may result in contamination of the seas and these spills may result in harm to birds or other marine animals.

Figure A-9: Number of incidents of oil and chemical spills from ships and installations (ACOPS, 2003-2014)



Table A-9 shows the estimated discharge volumes of oil and chemical spills recorded in the Eastern Scotland area between 2002 and 2013. The majority of spills are of relatively small volumes (between 1 and 455 litres). No spills have been over 50 tonnes.

Table A-9: Number of instances and estimated discharge volumes of oil and chemical in Eastern Scotland (ACOPS, 2003-2014)

Estimated Volume	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-455 litres	17	25	24	21	13	17	19	22	19	13	20	8
456-999 litres	-	2	3	-	-	1	-	1	-	-	1	1
1-50 tonnes	1	-	6	6	-	-	-	2	-	1	-	2
>50 tonnes	-	-	-	-	-	-	-	-	-	-	-	-
Not Known	-	5	4	-	2	12	12	3	10	9	4	9

A.5 Air

A.5.1 Air Quality

The main sources of air pollution include:

- Road engines (such as cars, trucks and buses)
- Non-road engines (aircraft, trains and boats)
- Industry and manufacturing
- Household and commercial

The transport network over most of the Highlands is sparse (The Highlands Council, 2013). The main road within the area is the A9, running along the Northern shore of Cromarty Firth passing through Invergordon to Thurso. The Highlands are overwhelmingly rural with limited industrial processes. The main industrial processes come from Inverness. Around Cromarty Firth industrial releases to the air come from Nigg Oil Terminal, with other smaller processes from Invergordon shore base, waste management processes and quarry and construction industries. The nearest airport is Inverness Airport, located south of the harbour waters. A railway runs around the Moray Firth, with a line from Inverness running along the Northern shore of Cromarty Firth passing through Invergordon on the way up to the North east. A ferry service runs across the entrance to the Cromarty Firth, between Cromarty and Nigg. Shipping activities are concentrated around Invergordon and Nigg. These factors result in low levels of air pollution in the area.

The nearest air quality monitoring site is in Inverness; air quality monitored here over the last 10 years indicates that the area is below air quality targets set out by National Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007. Generally, air quality in the Highlands is good however the review and assessment of air quality has identified another area in the city centre of Inverness where air quality objectives may not be achieved (The Highlands Council, 2013). In 2014, this area was declared by Highland Council (Inverness City Centre) as an Air Quality Management Area.

A.5.2 Pollutant Emissions

Emissions from shipping include sulphur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter (PM). The main greenhouse gas from ships is carbon dioxide (CO₂). Ship generated emissions can be significant in areas subject to heavy marine traffic, as a result there have been numerous actions undertaken

to significantly reduce emissions from ships. This includes initiatives to make ships more energy efficient, limits on air pollutants implemented through MARPOL Annex VI (Regulations for the Prevention of Air Pollution from Ships) and introduction of Emission control area (ECAs). ECAs are sea areas, where the amount of one or more kind of emissions is limited. Within ECAs emissions of SO_x, NO_x and PM must be further reduced to 1% for SO_x and PM, with a tiered approach to reductions in NO_x.

The North Sea is designated as an ECA for SO_x. Cromarty Firth is located within the ECA (see Figure A-10). The North Sea ECA was adopted in 2005, entered into force in 2006 and came into effect from 22 November 2007. To comply with the regulations ship operators must use fuel in engines and boilers with a sulphur content that is within the limits set down by the regulators. Alternatively the exhaust gas after combustion can be treated to remove the sulphur oxides or a combination of low sulphur fuel and after-treatment can be used on a ship. The ECA has a tiered reduction to limit SO_x to 1% m/m on and after 1st July 2010 and a further reduction to 0.1% m/m on and after 1st January 2015 (as stated in Regulation 14 in Annex VI of MARPOL). The sulphur emission reductions are expected to deliver significant pollution emission reductions from the shipping sector.

Nigg Oil Terminal monitors their own emissions including NO_x and SO_x and is governed by a SEPA licence (RSA/A/1032348 and RSA/A/1031481). Their routine missions result from power generation and flaring.

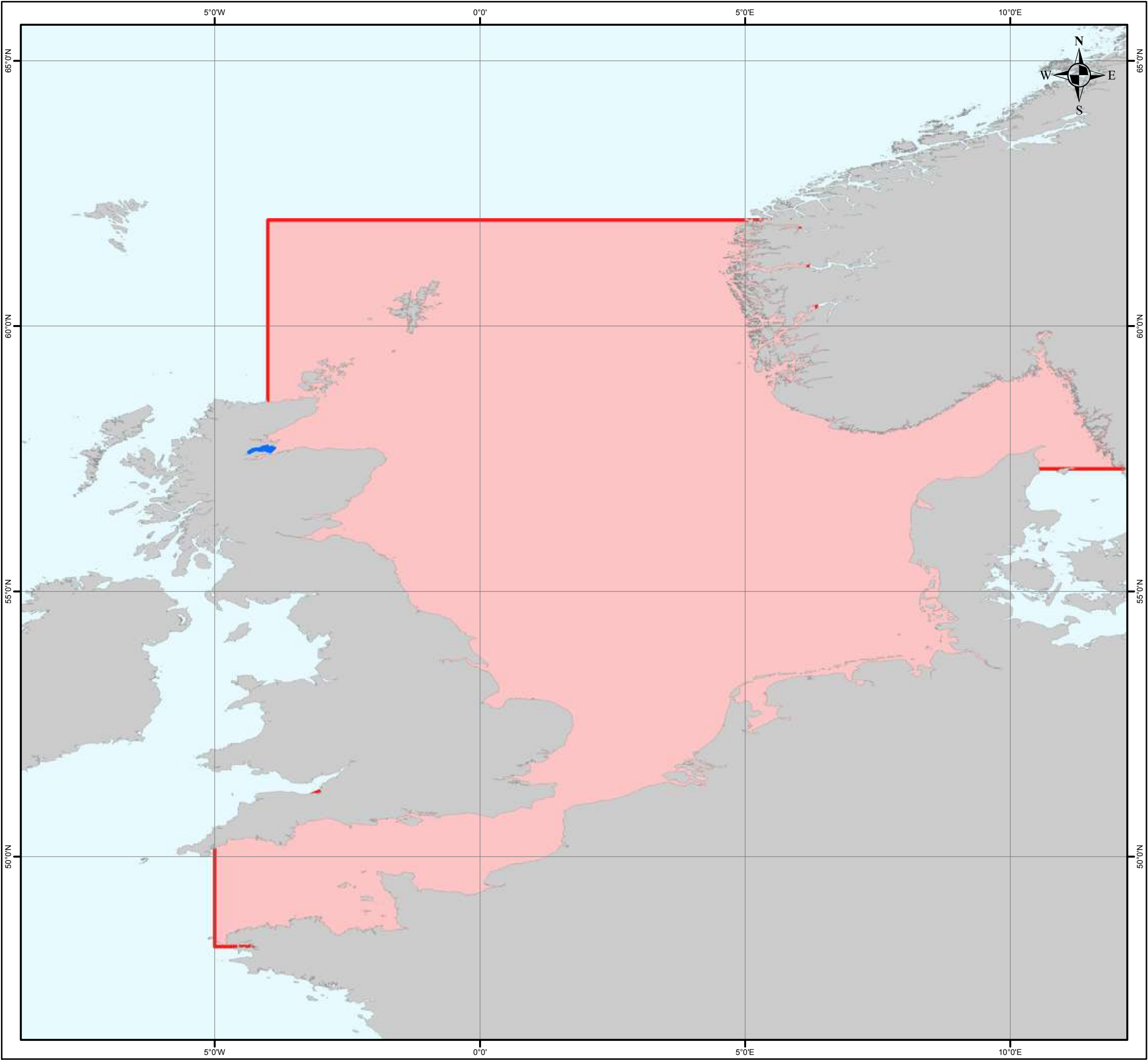
SO_x, NO_x and PM are by-products of combustion associated with engines used on ships and other engines. CO₂ is the primary greenhouse gas emitted through human activities.

The UK emissions maps produced by the National Atmospheric Emissions Inventory (NAEI) for 2012 (NAEI, 2013) show that total emissions including shipping from CO₂ are highest at Ainess and Invergordon (> 1995 units t/1x1km), followed by A9 corridor and the central area of Cromarty Firth around Invergordon (100 – 1995 units t/1x1km). Other areas of Cromarty Firth show levels of less than 100 CO₂ units t/1x1km.

Emissions data for SO₂ shows a similar pattern with the highest emissions (8-10 units t/1x1km) at Ainess and Invergordon, and also a number of other locations along the Cromarty Firth shore and the central area of Cromarty Firth (NAEI, 2013). The majority of the surrounding area shows emissions of between > 0.5 units t/1x1km.

Data for NO₂ illustrates highest emissions (> 25 units t/1x1km) are concentrated at Invergordon (NAEI, 2013). The A9 corridor and central and eastern area of Cromarty Firth show emissions of between 1 and 25 units t/1x1km. The majority of the surrounding areas show less than 1 unit t/1x1km, with areas of lower emissions in more rural areas.

Emissions data for PM follows a similar pattern.



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CROMARTY FIRTH PORT AUTHORITY

Oil Transfer Licence Application

Figure A-10: North Sea Emissions
Control Area

Legend

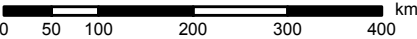
- Cromarty Firth Harbour Area
- North Sea Emissions Control Area

NOTE: Not to be used for Navigation

Date	Thursday, May 28, 2015 10:39:14
Projection	GCS_WGS_1984
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, SNH
File Reference	J:\P1946\Mxd\Report\Appendix_A\ Emissions_Control_Zone.mxd
Created By	Emma Langley
Reviewed By	Ian Charlton
Approved By	Chris Mooij



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A.6 Landscape

The Moray Firth encompasses a diverse coast of sandy bays, sandstone cliffs, pebble beaches and rocky shores. The hinterland is also diverse, with three large firths, Beauly, Dornoch and Cromarty (SNH, 2002).

Cromarty Firth lies within the Moray Firth and is one of the finest natural harbours in the world. The deep water channel and sheltered nature of the firth has meant that the Cromarty Firth has always been of considerable importance for shipping and trade, although active harbours now exist only at Cromarty and Invergordon. Most shipping is now in connection with oil developments and the cruise liner markets (Halcrow Group Limited, 2009).

The area has had a long association with the Royal Navy. The Navy have had a presence at Invergordon since the late 19th Century although they left in 1995. The firth and the associated Moray Firth are still used for training purposes. The Cromarty Firth and Invergordon were of considerable importance during both world wars and use of the area was not confined to the Cromarty Firth, there being air fields within one kilometre of the shore at Alness, Evanton and Fearn (Halcrow Group Limited, 2009).

The inner firths of the Moray Firth (including Cromarty Firth) contains extensive tidal flats, sheltered sand and mud flats fringed with saltmarshes (SNH, 2002). Much of the low land surrounding Cromarty Firth is farm land, with some woodland on higher ground.

A.7 Soil

Screened out of the assessment.

A.8 Climate

Screened out of the assessment.

A.9 Material Assets

8.1.1.2 Industrial

The Cromarty Firth contains a number of key industrial facilities. Within the Cromarty Firth at the Invergordon Service Base PoCF are undertaking a port expansion. The development will reclaim 9 acres of land from the sea, providing operational land as well as an additional deep water berth. The work is planned for completion in August 2015.

The Nigg Oil Terminal in the Cromarty Firth receives oil from the Beatrice field. This oil is transported from the hydrocarbon field via a pipeline to a landfill south of Balintore. The Nigg Oil Terminal has been active since 1981. Oil stored at the terminal is exported to oil refineries via tankers. Ship-to-Ship transfers of oil also occur at the terminals Jetty, these are normally crude oil from shuttle tankers (Tailsman Energy, 2006).

A.1.1 Waste

The Waste Management Plan (CFPA, 2015b) contains details of the different types of port waste and how these are to be managed, locations of waste reception facilities and procedures for reporting and recording waste received. Reception facilities for waste oils and oily waste within Cromarty Firth are provided by approved contractors, Sureclean Ltd and M.S. Industrial Services Ltd (CFPA, 2015b). This is on an as required basis with the ships agents ordering the services directly.

In the event of an oil spill the disposal of waste oil, which has been contained or recovered following a spill or incident, is described in the CFPA Oil Spill Contingency Plan (OSCP). Oil that is heavily contaminated with debris poses problems for final disposal; there is a shortage both of approved landfill sites and an absence of incineration facilities in mainland Scotland, although there is a small incinerator on Shetland suitable for the incineration of oily wastes (Intertek, 2015).

In the event of an oil pollution incident SEPA will respond and provide advice to mitigate or prevent further pollution where practicable. SEPA will regulate and licence the storage, transportation and disposal of any waste products collected as a result of the oil spill recovery operations. As a regulatory body, SEPA are not responsible for any clean-up operations or costs associated with any clean-up activities (Intertek, 2015). SEPA can also advise on the impacts of spills and at-sea operations as far as these affect licensed sites e.g. marine fish farms.

Oil collected on shores and beaches can be temporarily stored using Waste Management Exemption Notice No 41, which allows storage at the place of production. At present there are no licensed sites around the Cromarty Firth, however, Sureclean Ltd and M.S. Industrial Services Ltd is licensed to store significant quantities of solid material prior to final disposal (Intertek, 2015).

A.1.2 Renewable Energy

The nearest renewable energy site is the Burghead, Moray Firth Wave lease site. The site is currently in the planning phase and is being developed by AWS Ocean Energy Ltd.

A.2 Cultural Heritage

A.2.1 Wrecks

There have been a number of ships wrecks recorded in the Cromarty Firth over the years; however the majority of these have been salvaged due to the value of the vessels and/or cargo and to maintain the shipping channels (Affric, 2013).

There is one wreck designated as Controlled Sites under the Protection of Military Remains Act 1986 within the Cromarty Firth. This is HMS Natal which sank in 1915.

There are a number of other wrecks (vessels and aircraft) recorded within the harbour waters and surrounding water as identified by the Royal Commission on the Ancient & Historic Monuments of Scotland (RCAHMS).

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