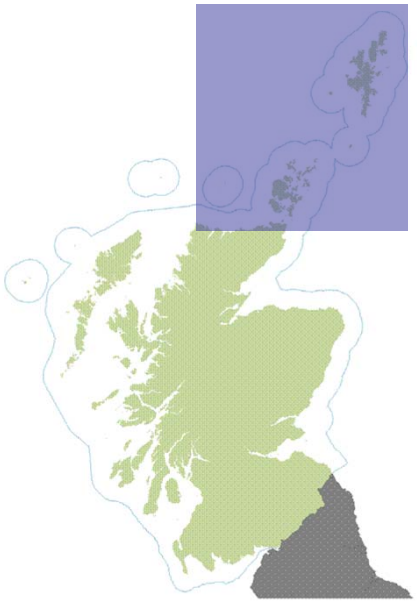
3. NORTH



The North Region three Scoping Areas of Search.

The Scoping Areas of Search are:

- Pentland Firth
- Orkney and Westray
- Sumburgh and Fair Isle

3.1 Resource

Pentland Firth

3.1.1 The strongest power densities are located in the middle of this area of search around the Isle of Stroma. The strength of the resource decreases away from this point. Four agreements for lease to develop tidal energy sites have been consented by the Crown Estate in this area.

3.1.2 Tidal resource at its strongest in this site the mean spring annual power density at this location is of 11.65 kWatt m^{-2} and can reach a maximum of 46.38 kWatt m^{-2} Mean neap power density is 1.43 kWatt m^{-2} . Mean annual spring peak flow is of 2.6 ms^{-1}. The tidal range rises from a mean neap of 1.27 m to 2.76 m at spring tides.

Orkney and Westray

3.1.3 Seven distinct areas of search have been identified within the Orkney and Westray area. The tidal currents will generate faster speeds and hence, more power when constrained between two land masses. In the Orkney region this occurs a number of times for example between, Mainland and Hoy and Mainland and Rousay.

3.1.4 Taken together, the mean annual power density of these sites is of 1.19 kWatt m^{-2} but is higher in some locations such as the stretch of water between Eday and Rousay at approximately 40 kWatt m^{-2}. Mean neap power density for all these sites is 0.69 kWatt m^{-2} and for mean spring it is 4.71 kWatt m^{-2}. Mean spring peak flow is 1.96 ms^{-1} and the mean range goes from 1.22 m at neap and 2.6 m at spring tides.

Fair Isle and Sumburgh Head

3.1.5 Tidal resource is relatively smaller than regions like the Pentland Firth but still hold enough potential to be considered commercially.

3.1.5 Mean power density at Fair isle is 0.56 kWatt m^{-2} with a 0.32 kWatt m^{-2} mean at neap tide and a mean of 2.12 kWatt m^{-2} for spring tides.

3.1.6 Mean spring peak flow is 1.6 ms^{-1} and the mean spring and mean neap ranges are 1.7 m and 0.8 m respectively.

3.1.6 At Sumburgh Head the mean power density is 0.52 kWatt m^{-2}. The mean neap power density is 0.28 kWatt m^{-2} and that for the spring is 2.07 kWatt m^{-2}. Mean spring peak flow is of 1.6 ms^{-1} and the mean neap and spring tidal ranges are 0.53 m and 1.16 m respectively.

Fig.3.1 Pentland Firth (Area of Search) Tidal Energy Resource

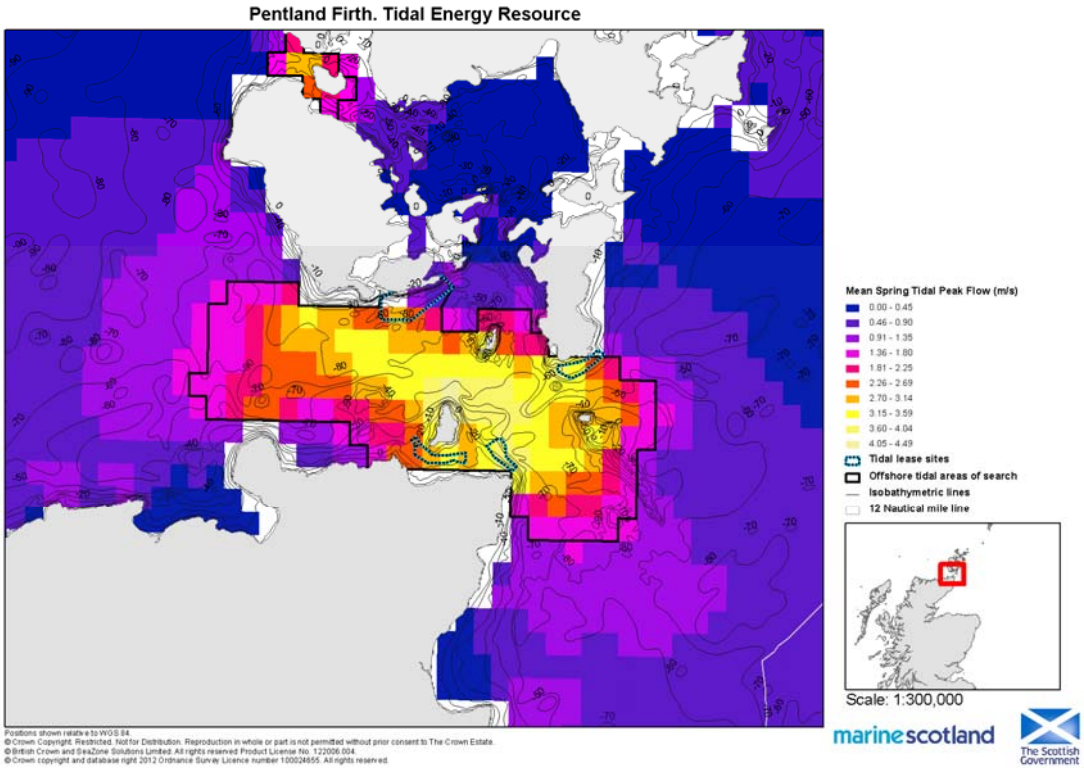


Fig.3.2 Orkney & Westray (Area of Search) Tidal Energy Resource

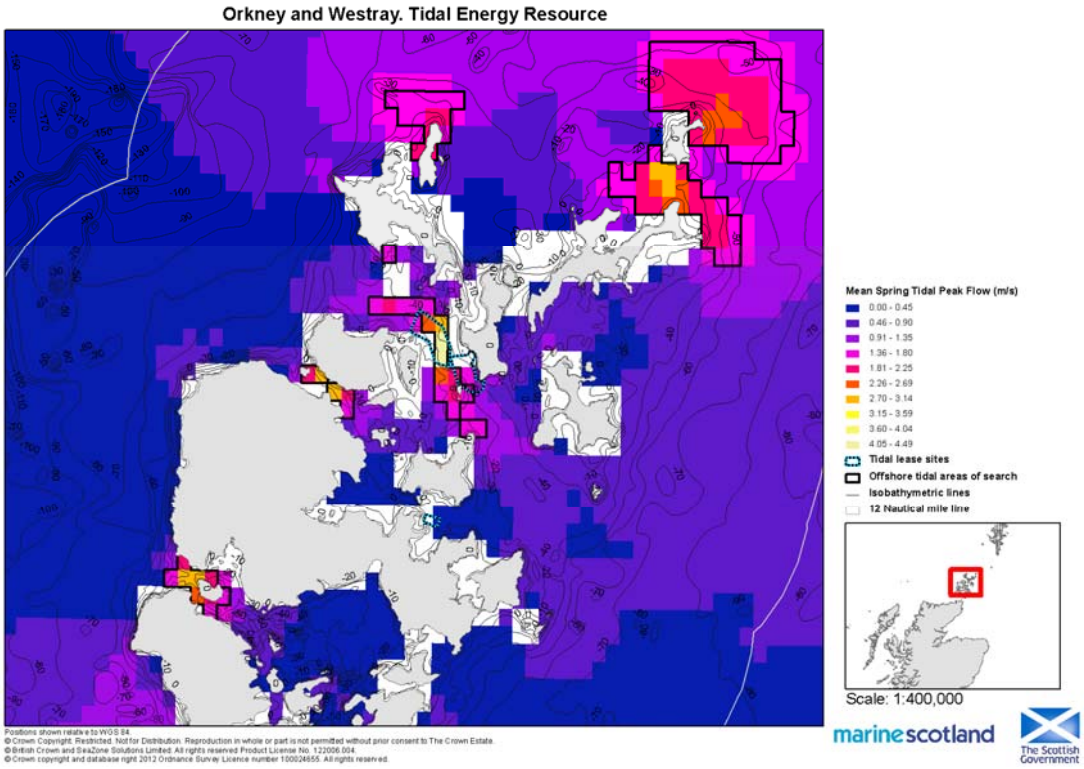
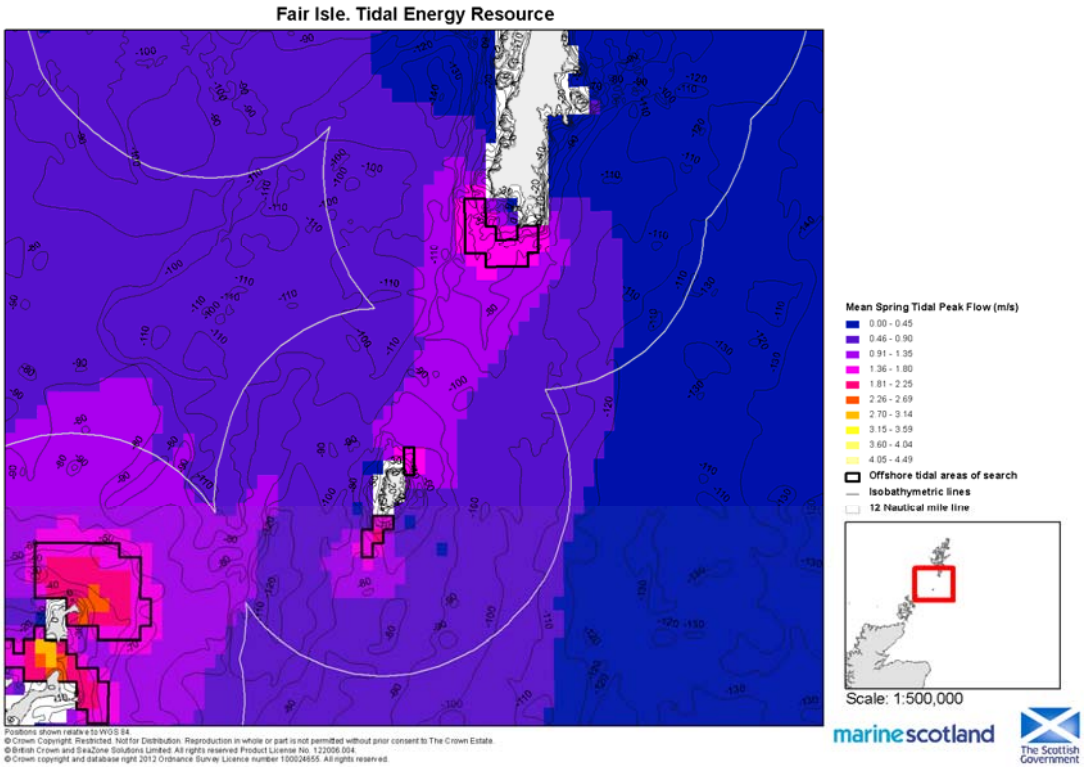


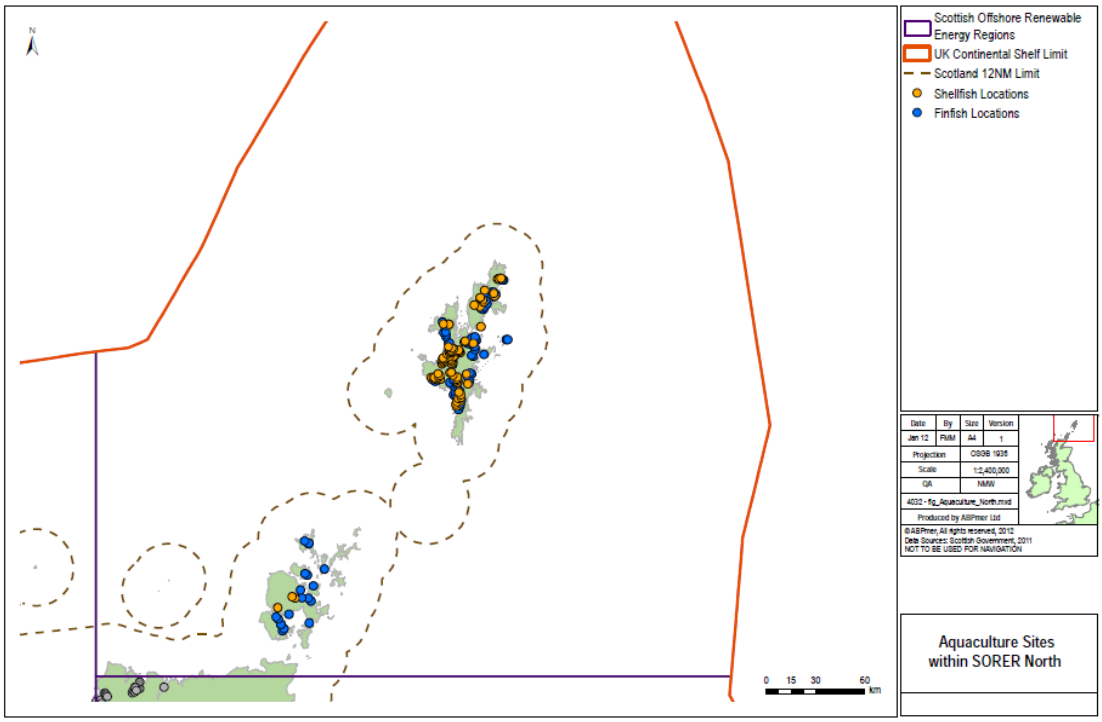
Fig.3.3 Sumburgh & Fair Isle (Area of Search) Tidal Energy Resource



3.2 Aquaculture

3.2.1 Marine aquaculture sites within the North Region are shown in Figure 3.4, where there are 120 finfish and 83 shellfish sites with a number being located along the coastline of the Orkney Islands and in particular the Shetland Islands.

Fig.3.4 Aquaculture in the North Region



3.2.2 In 2010, the marine aquaculture industry in the North Region had an estimated 299 full-time and 83 part-time staff.

Areas of Seach

- *Pentland Firth,Orkney and Westray*

3.2.3 There are no aquaculture facilities within the areas of potential development. Some 22 finfish farm sites and 4 shellfish farm sites surround the Orkney Isles. The area is responsible for 6% of Atlantic salmon production. No shellfish production for the table or for on-growing was reported in 2011.

- *Fair Isle and Sumburgh Head*

3.2.4 There are numerous fish and shellfish farm sites surrounding the majority of the Shetland islands with the exception of the south east and some north west areas. Shetland is responsible for producing 29% of Atlantic salmon, 65% of mussels for the table, 63% of mussels for on-growing and 0.8% of Pacific oysters for the table, however, no aquaculture sties are close to the areas of development at Sumburgh Head or Fair Isle.

3.2.5 Figs.3.5 - 3.7 Provide an overview of aquaculture activities within the Areas of Search.

Fig.3.5 Aquaculture activities in the Pentland Firth (Area of Search)

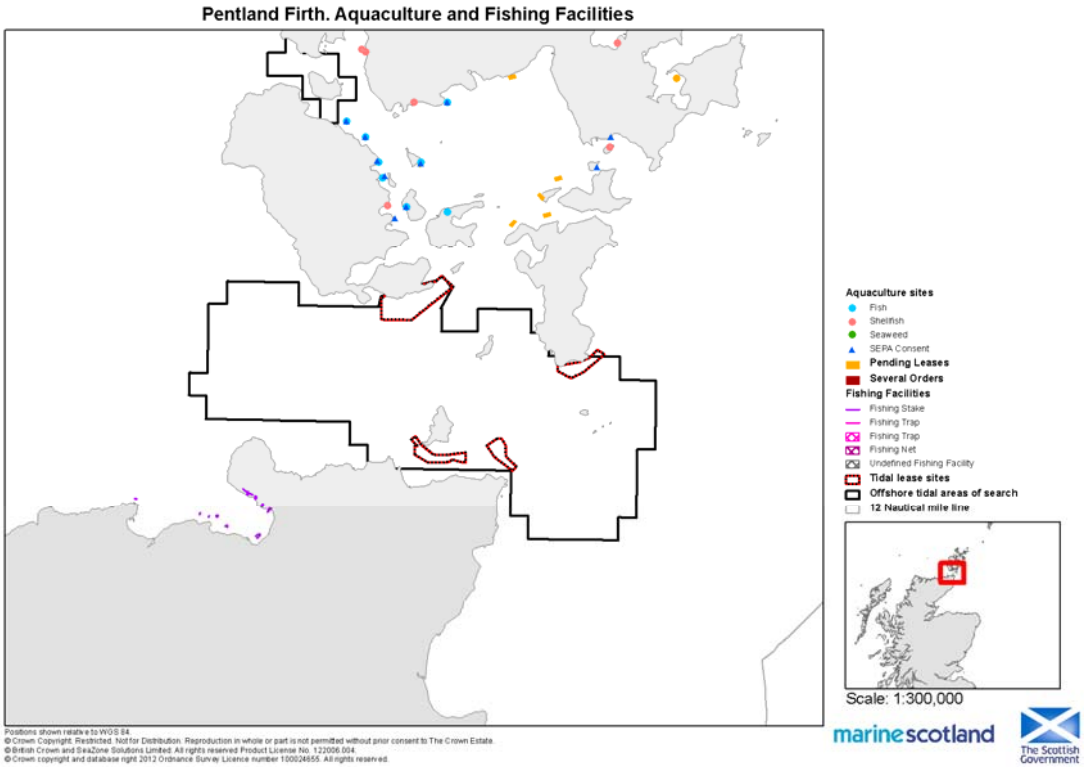


Fig.3.6 Aquaculture Activities in Orkney & Westray (Area of Search)

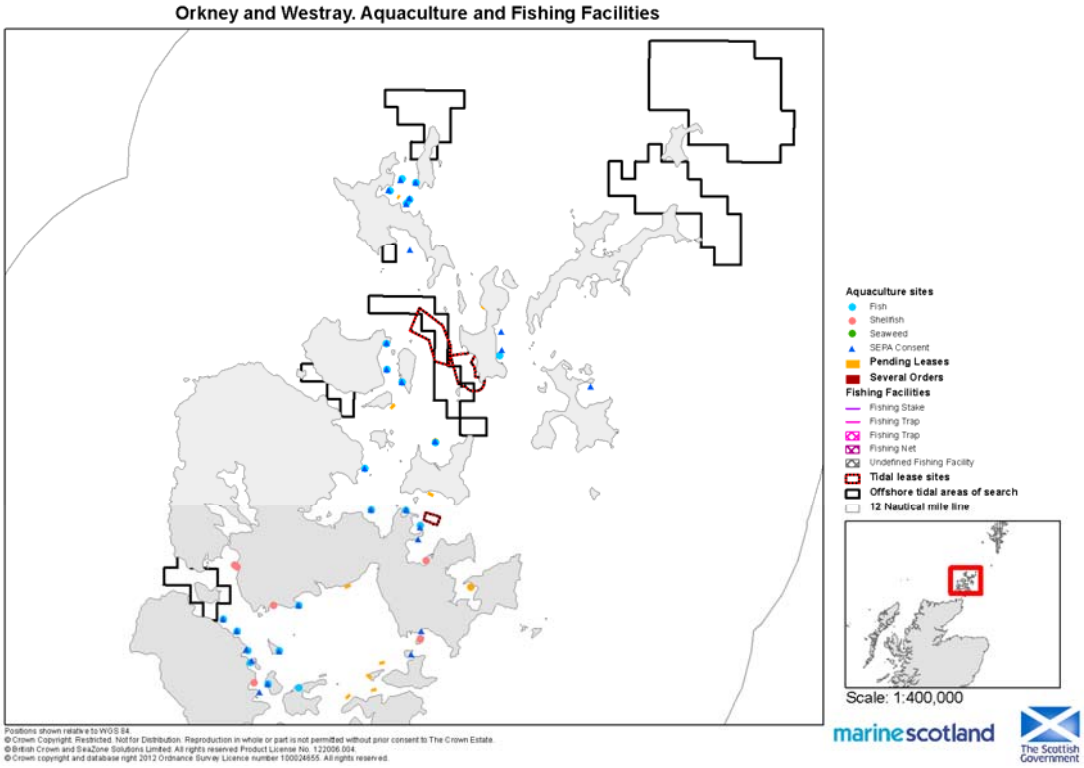
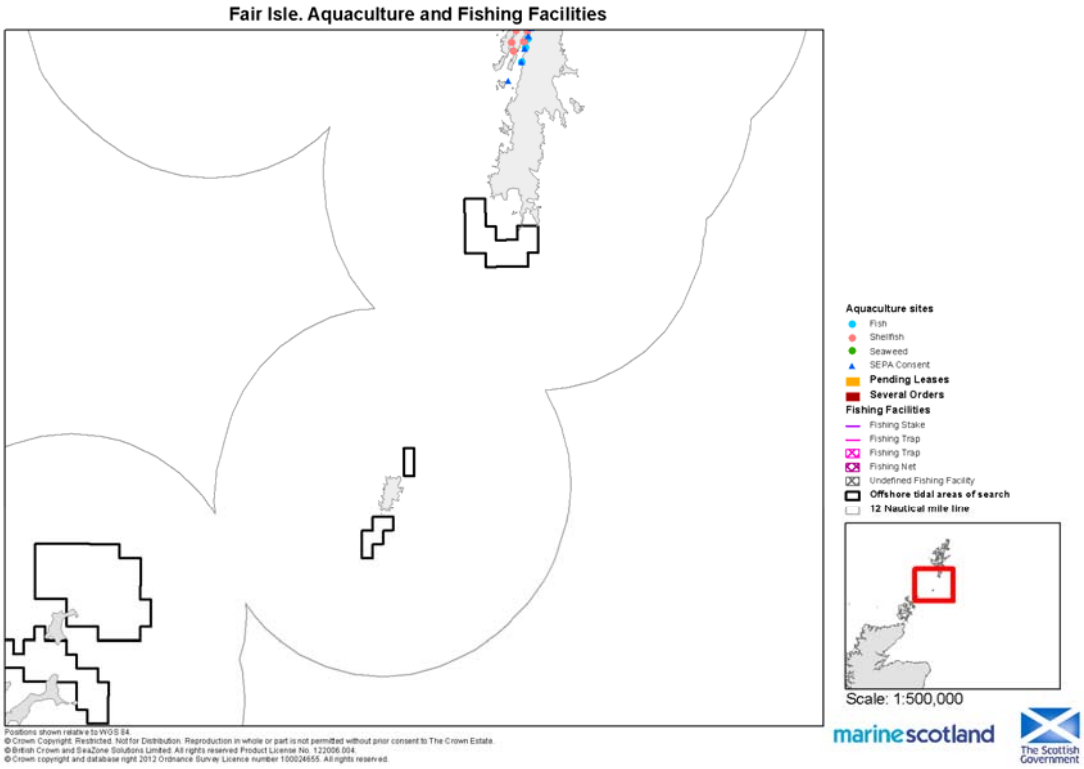


Fig.3.7 Aquaculture Activities in Sumburgh & Fair Isle (Area of Search)



3.3 Aviation

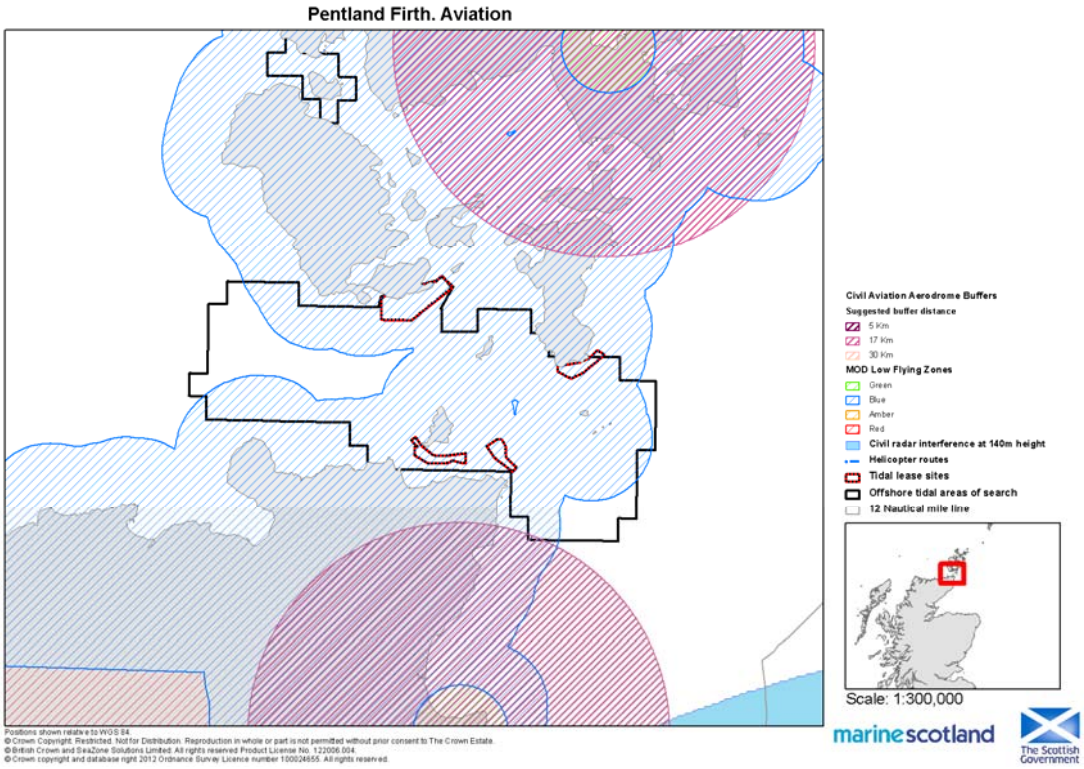
3.3.1 Airports in this region include the 'minor' airports of Kirkwall in Orkney and Sumburgh, Lerwick and Scatsta in the Shetland Islands.

3.3.2 It is unlikely tidal energy devices will have any direct interaction with aviation.

3.3.3 Figs.3.8 - 3.10 shows the known aviation activities taking place in relation the the Pentland Firth, Orkney & Westray and Sumburgh & Fair Isle (Areas of Search).

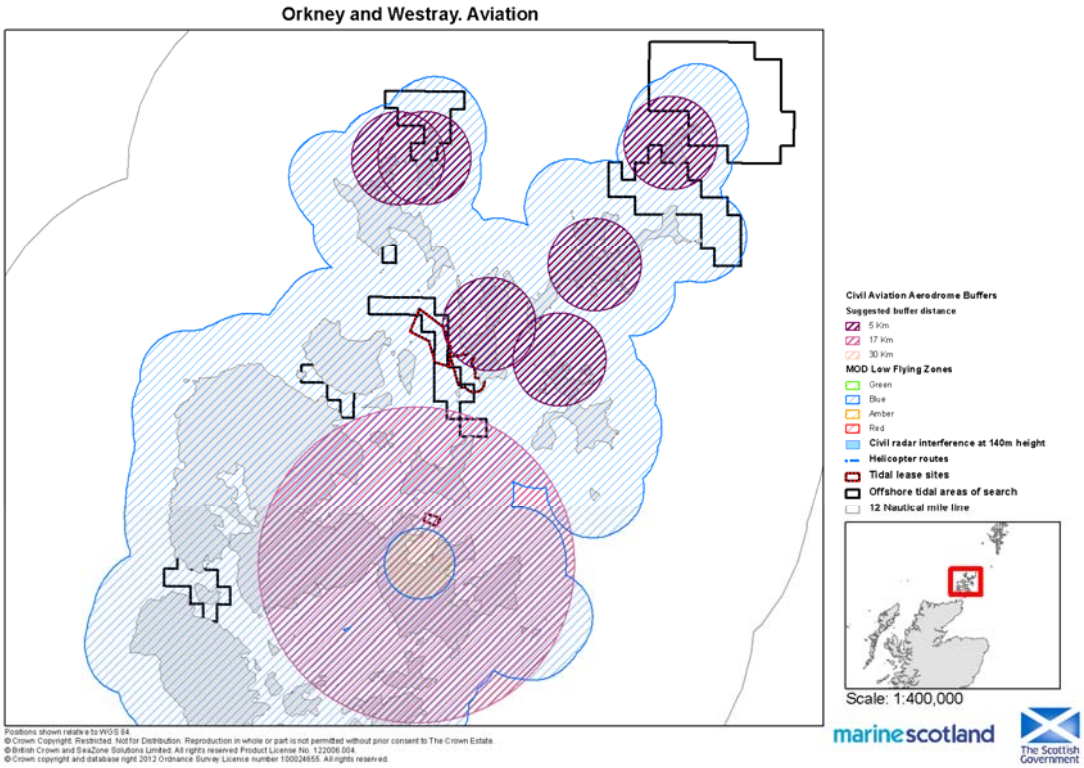
Pentland Firth

Fig.3.8 Aviation activities in the Pentland Firth (Area of Search)



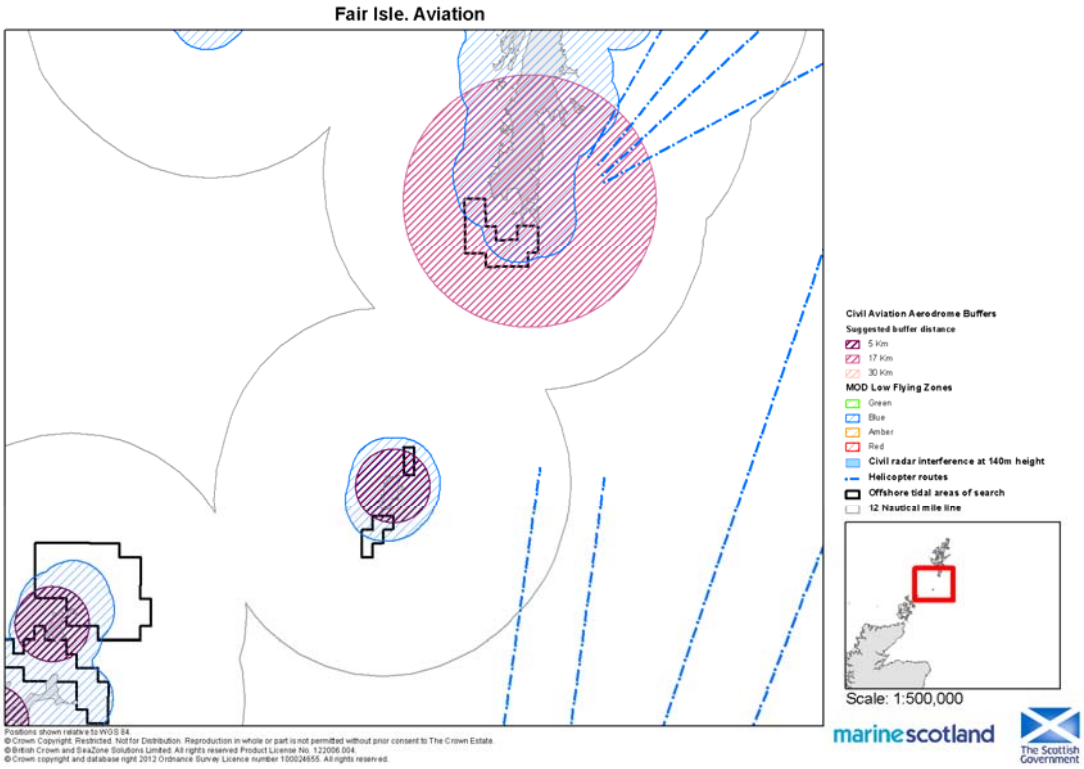
Orkney and Westray

Fig.3.9 Aviation Activities in Orkney & Westray (Area of Search)



Sumburgh and Fair Isle

Fig.3.10 Aviation Activities in Sumburgh & Fair Isle (Area of Search)



3.4 Bathymetry and Seabed

Pentland Firth

3.4.1 Depths within the area of search in the Pentland Firth vary from 20 m to 96 m, with an average depth around 60 m; the western part of the area is deeper and the central area south of Stroma, is the shallowest part .

3.4.2 The sediment type in the Pentland Firth area of search composed of a central mass of undifferentiated rock bordered on the west by gravelly sand and on the east by sandy gravel as described in the BGS bottom sediment dataset. The EUNIS data describes this habitat as being composed predominantly of faunal communities on deep moderate energy circalittoral rock running through the central part east to west surrounded by high energy circalittoral rock with some deep circalittoral coarse sediment to the east and west.

Orkney and Westray

3.4.3 Water depths within Orkney and Westray are shallower as these sites lie closer to land. The range of depths within these sites goes from as little at 5 m in parts of the area of search between Rousay and mainland up to 70 m in the north parts of the area of search north of North Ronaldsay.

3.4.4 The seabed map around Orkney does not cover fully the most inland parts of the areas of search but the areas that it does cover show predominantly sandy gravel or gravelly sand. This can be corroborated with the predicted EUNIS database which cites the tidal areas of search as coarse sediment or high energy infralittoral rock.

Fair Isle and Sumburgh Head

3.4.5 Depths in the north and south parts of the Fair Isle area of search show depths of 40 m to 100 m. even though close to land these areas of search are still relatively deep. The same can be said fro Sumburgh head whch displays a mean of 60 m and goes from 45-87 m.

3.4.6 The sediment that characterises these areas is coarse sediments such as sandy gravel and gravelly sand with some high energy rocky sections within the Sumburgh Head area.

Fig.3.11 Pentland Firth (Area of Search) Seabed Sediments

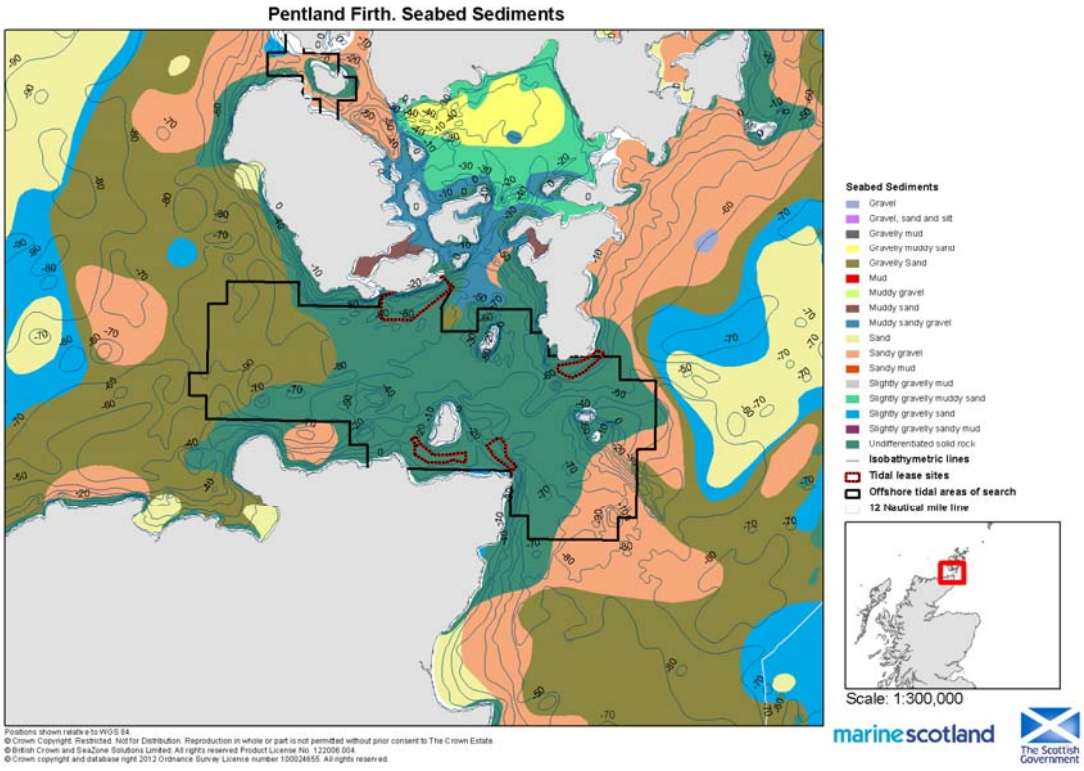


Fig.3.12 Orkney and Westray (Area of Search) Seabed Sediments

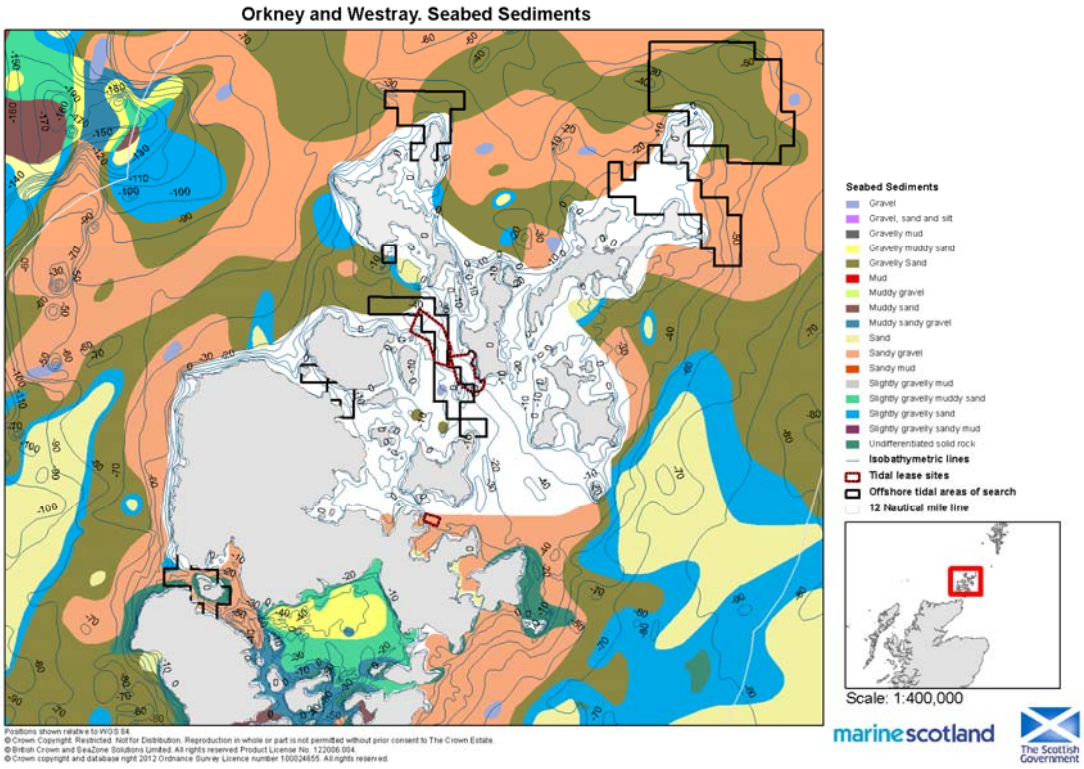


Fig.3.13 Sumburgh and Fair Isle (Area of Search) Seabed Sediments

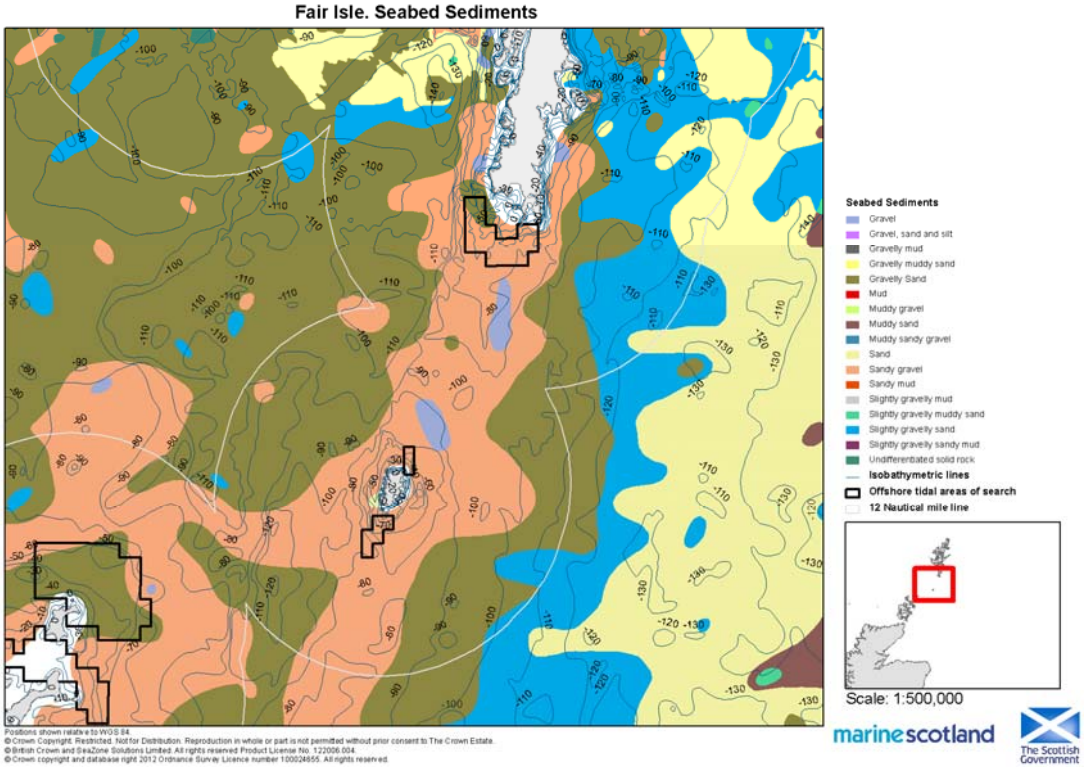


Fig.3.14 Pentland Firth (Area of Search) Seabed Seabed Predicted EUNIS Habitats

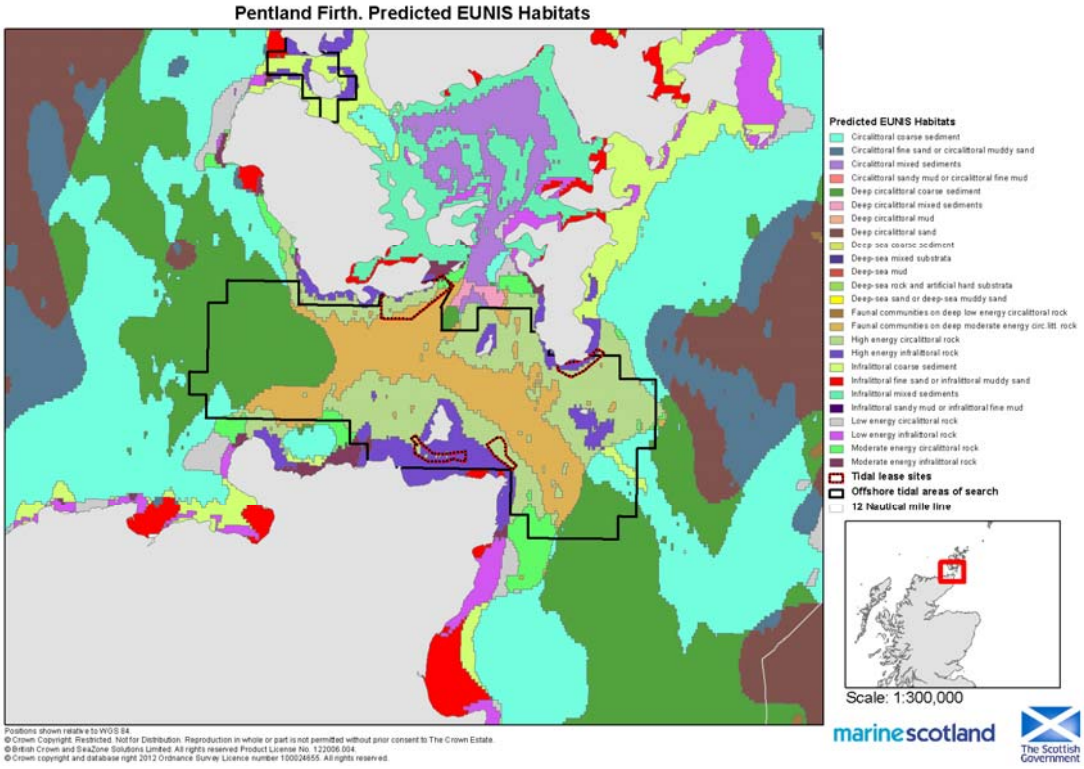


Fig.3.15 Orkney and Westray (Area of Search) Seabed Seabed Predicted EUNIS Habitats

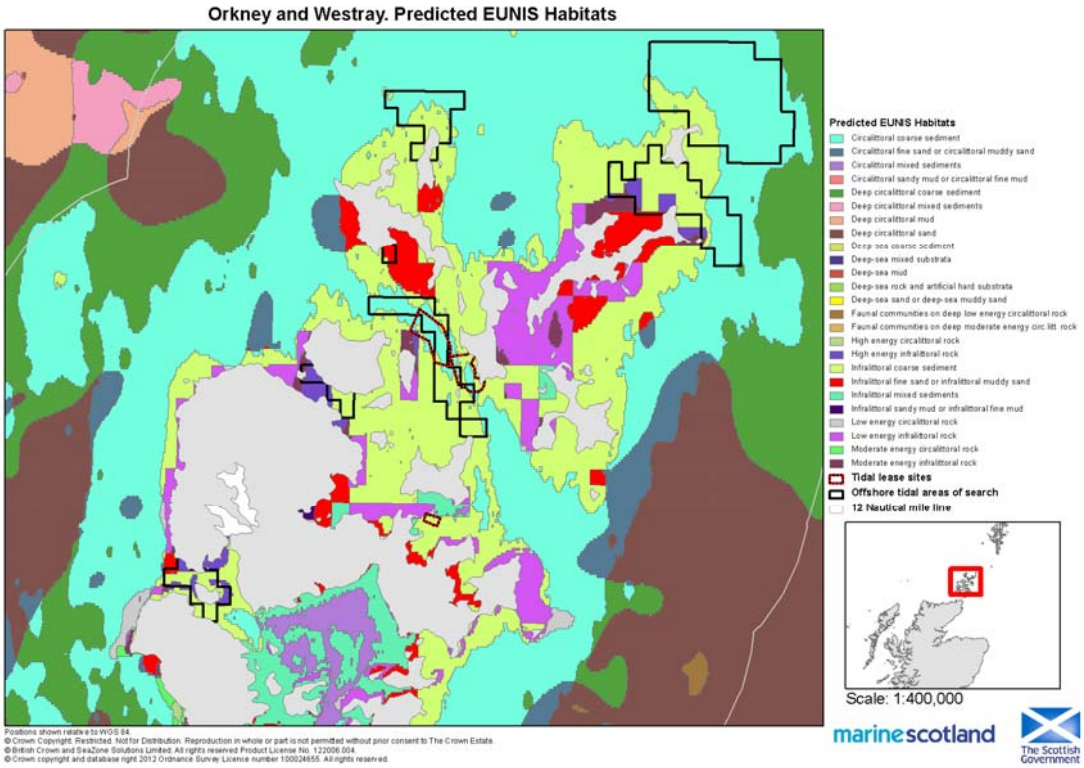
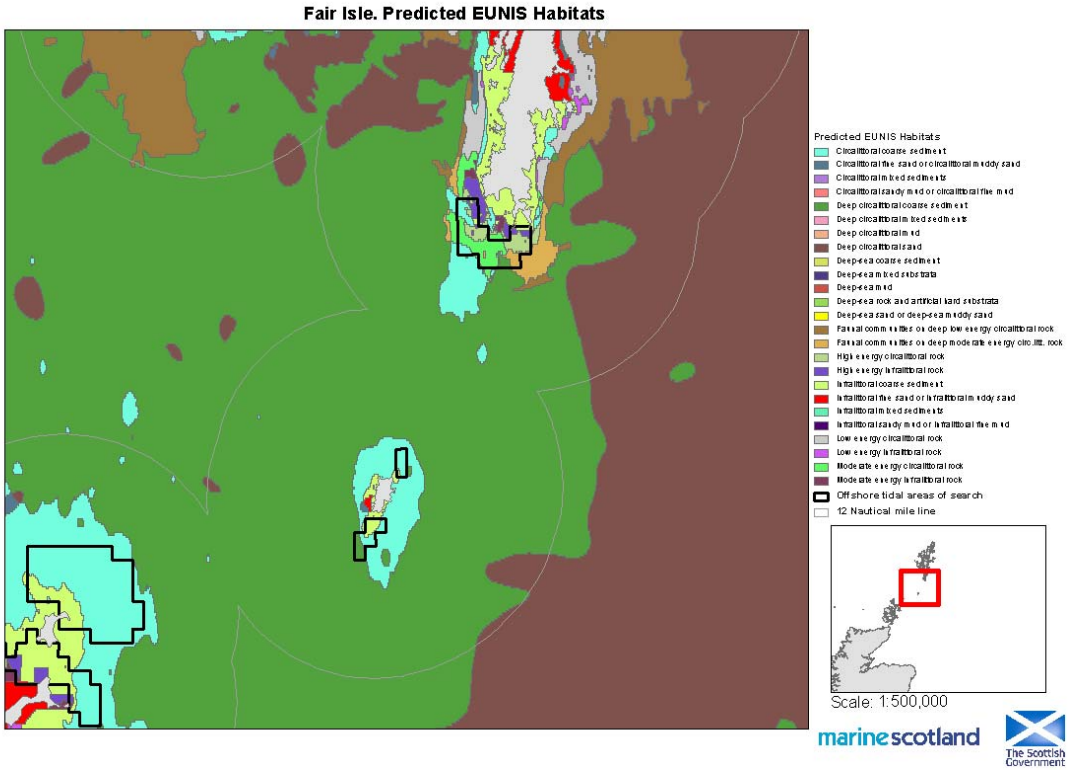


Fig.3.16 Sumburgh and Fair Isle (Area of Search) Seabed Seabed Predicted EUNIS Habitats

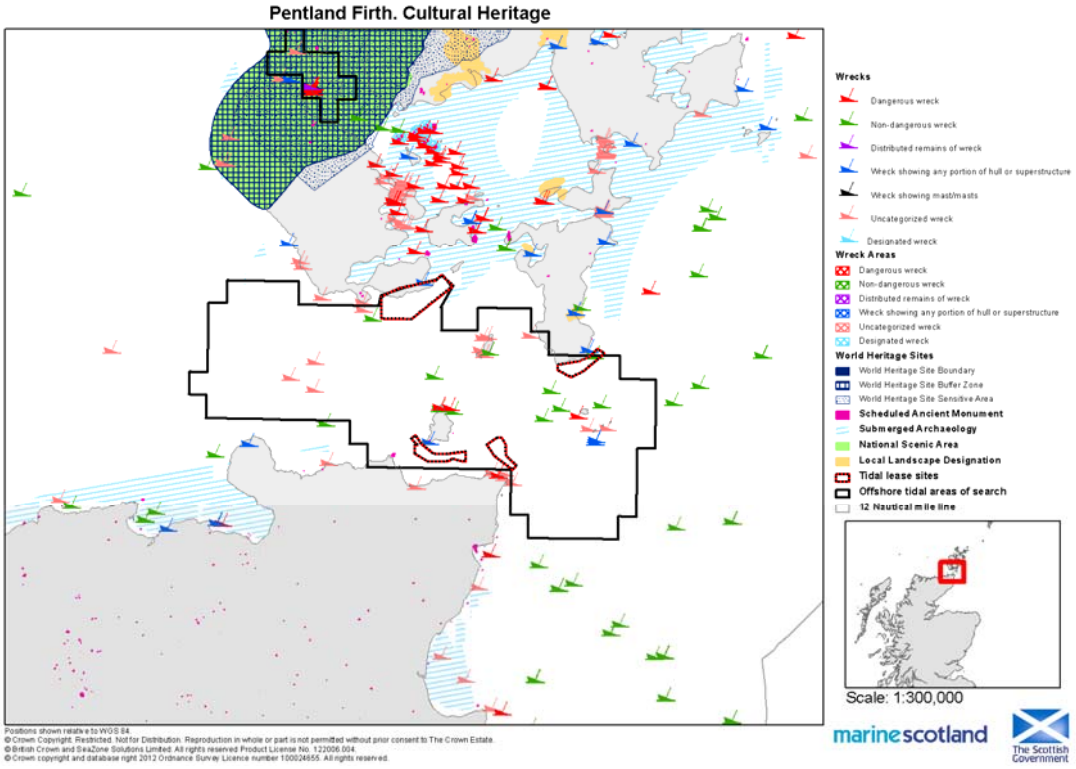


Cultural Heritage

Pentland Firth

3.5.1 The maps show that the area of search includes numerous wreck sites. Of greatest importance are the remains of ships from the German High Seas Fleet in Scapa Flow. These seven wrecks are scheduled monuments, and have been extensively mapped. A Voluntary Underwater conservation zone is in place for the Scapa Flow area, and any activities or developments which could impact on the scheduled monuments require consent from Historic Scotland.

Fig.3.17 Key Cultural Heritage Assets in the Pentland Firth (Areas of Search)



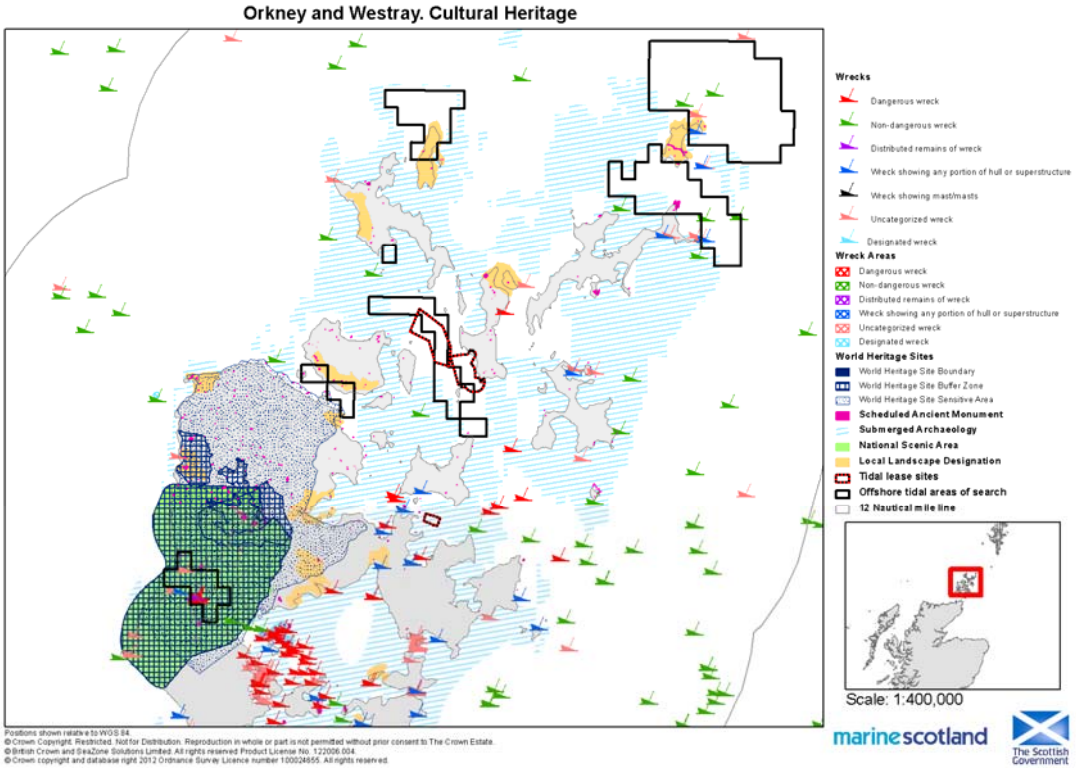
Orkney and Westray

3.5.2 The area to the north and west of Orkney is close to extensive areas around the Orkney coast which have potential for submerged archaeology. On Orkney, the Heart of Neolithic Orkney World Heritage Site and its buffer zone covers an extensive area on the west coast of Orkney. The numerous listed buildings and scheduled monuments around the Orkney coast include lighthouses, cairns, chapels and dwellings, with varying levels of listing and importance.

3.5.3 Recent work to incorporate Orkney's marine heritage sites into the new marine legislation framework have recently been published. "Project Adair" seeks to integrate all available databases of known wrecks (UKHO, Canmore) for the Scottish territorial waters (0-200 NM) and develop ways to make this data available to the public. This project was implemented in order to support new marine environmental protection, marine planning and licensing systems, and to help guide sustainable development.

3.5.4 The results will be collected in a GIS geodatabase and will be available on request from the contractor.

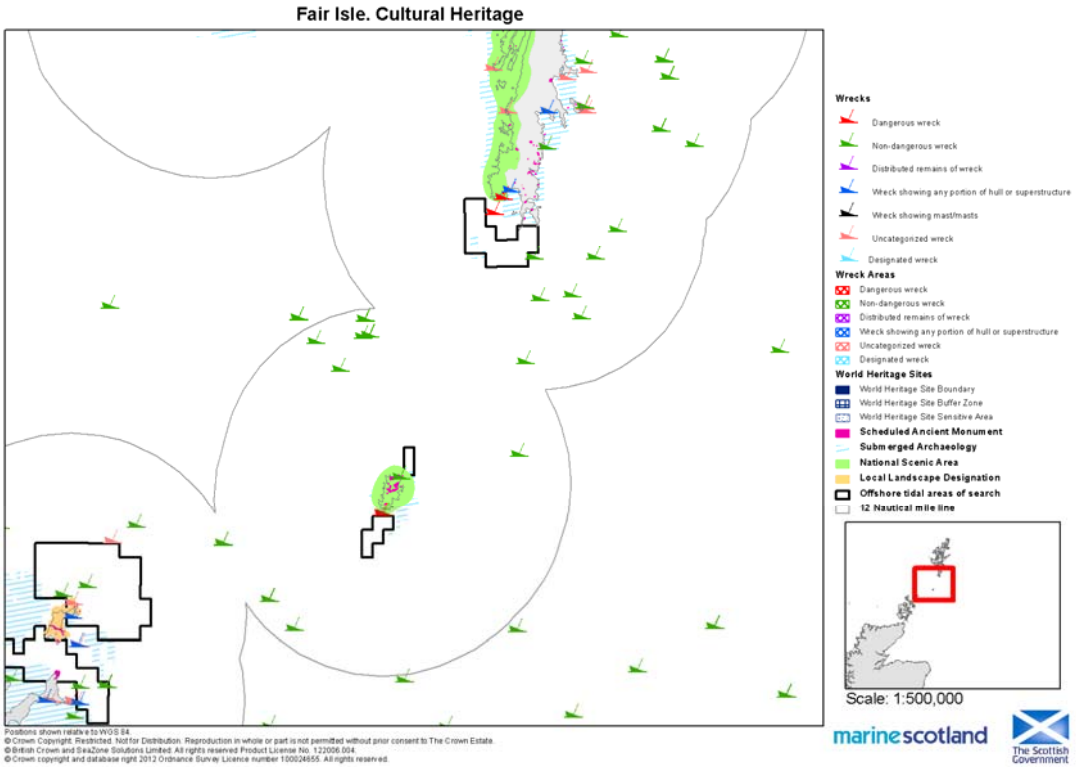
Fig.3.18 Key Cultural Heritage Assets in the Orkney and Westray (Areas of Search)



Sumburgh and Fair Isle

3.5.5 There is a similar picture of cultural heritage interest on and around the Shetland Islands, where extensive areas have been identified as potentially of interest for submerged archaeology. There are clusters of designations distributed across the islands, from the North Unst Lighthouse in the north to the Sumburgh Head Lighthouse in the south, which are both Category A listed. Off the coast, there arte two designated wreck sites: 'Kennemerland' which includes scattered remains over a wide area at Stoura Stack on Out Skerries and 'Wrangels Palais' at Bound Skerry of the east coast of Out Skerries. There are a further 14 locally protected wreck sites around Shetland. The Shetland Marine Spatial Plan identifies several areas of coastal archaeology which is at risk as a result of coastal erosion.

Fig.3.19 Key Cultural Heritage Assets in the Sumburgh and Fair Isle (Areas of Search)

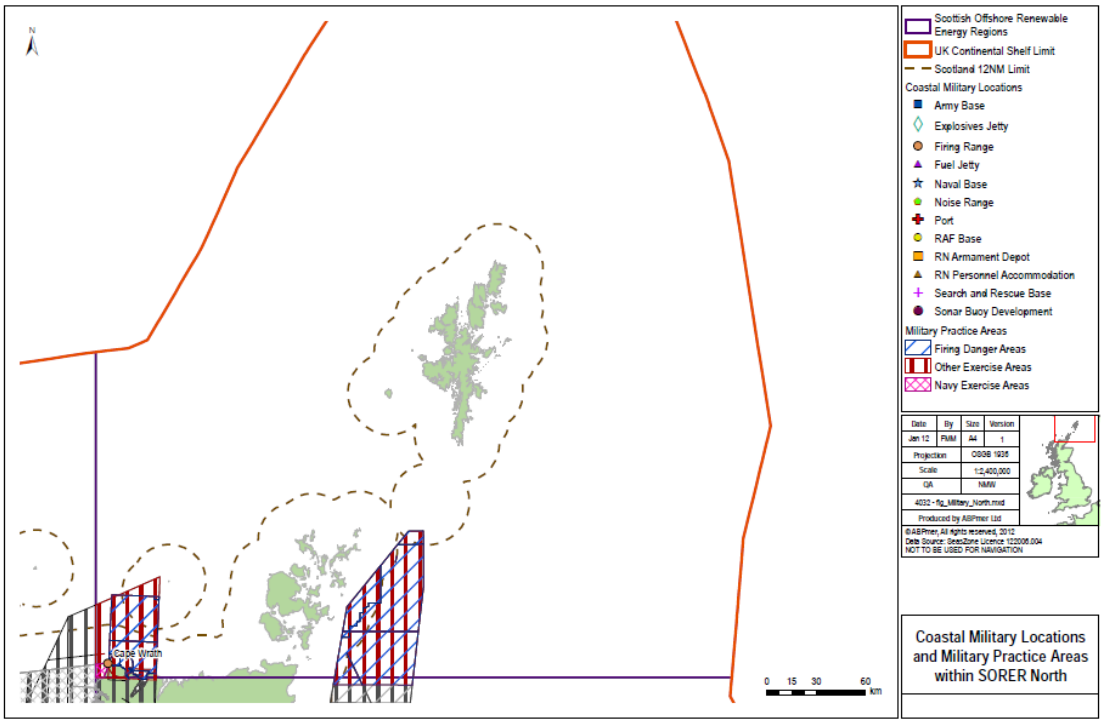


Defence

3.6.1 The coastal military locations which occur within this region are shown in Figure 3.20. Military interests in this region include:

- Cape Wrath official gunnery and bombing range, mainly used for live gunnery practise by the Royal Navy and allied navies and for live bombing practise by the RAF and the Fleet Air Arm (FAA); and
- A 'firing danger' and 'other' exercise area to the East of Orkney (which extends into the North East SORER).

Fig.3.20 Defence activities in North Region



3.6.2 Figures 3.21-3.23 below show the known defence activities which take place within the current search areas for offshore tidal energy from the Pentland Firth to Sumburgh Head both Orkney and Shetland.

3.6.3 None of the represented military practice areas overlap with the tidal areas of search in the North region.

Fig.3.21 Defence activities in the Pentland Firth (Areas of Search)

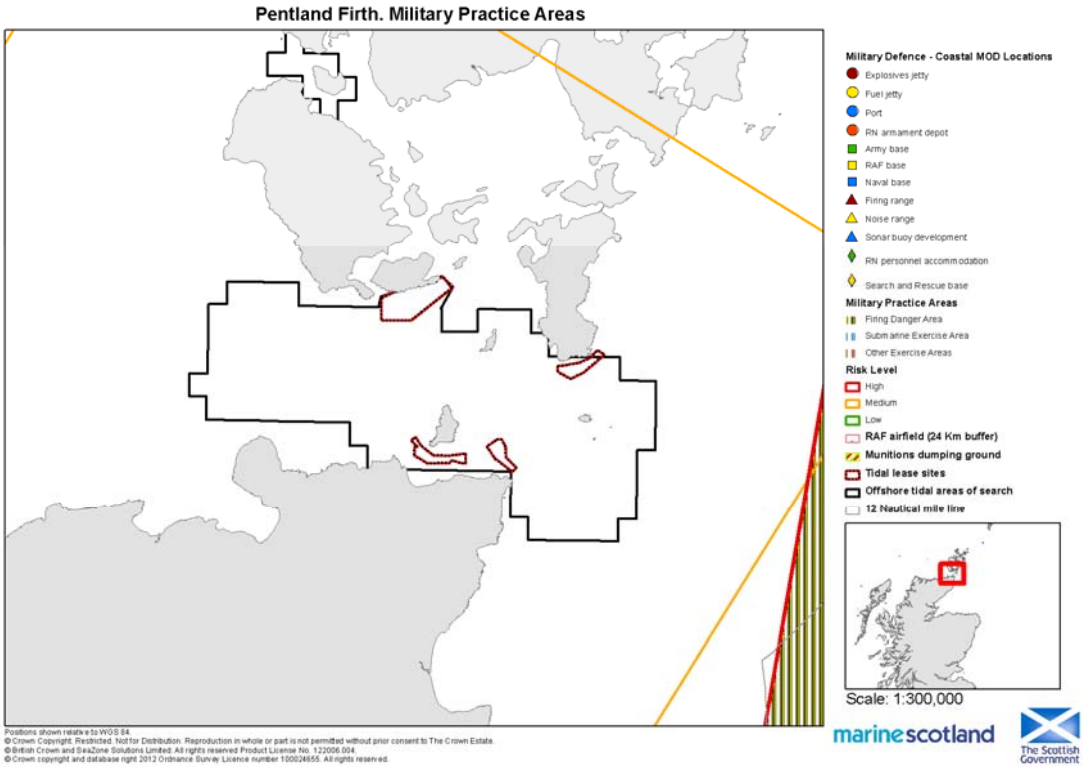


Fig.3.22 Defence activities in the Orkney and Westray (Areas of Search)

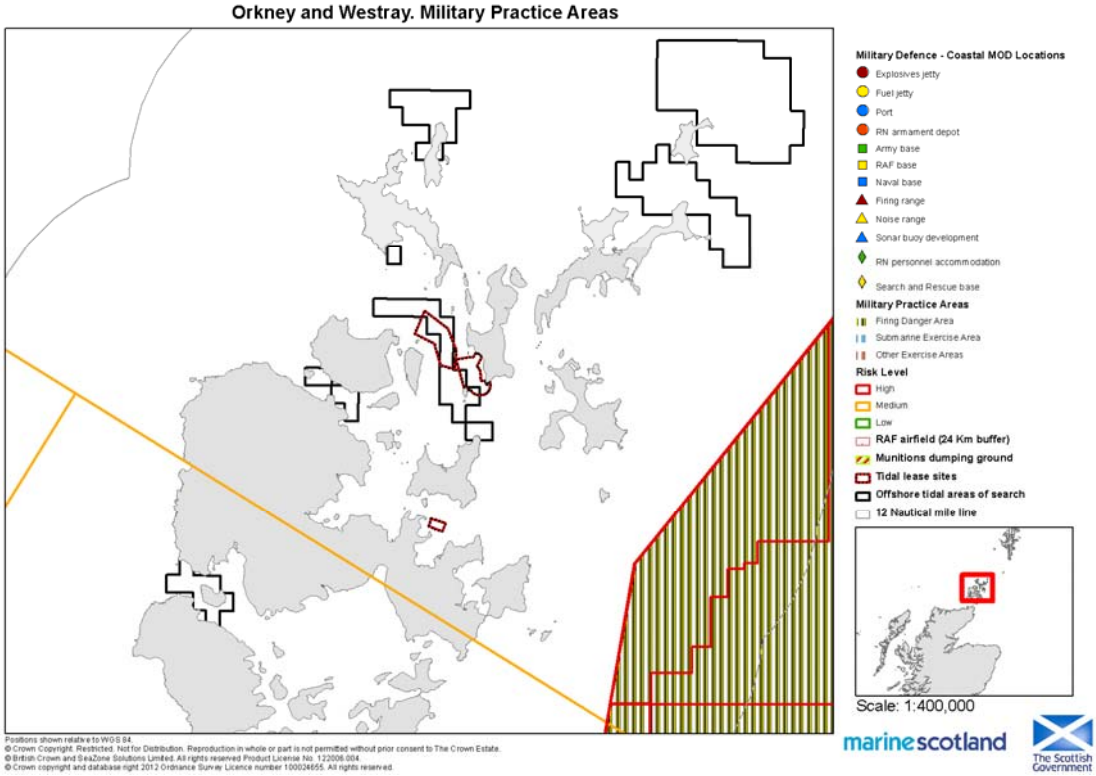
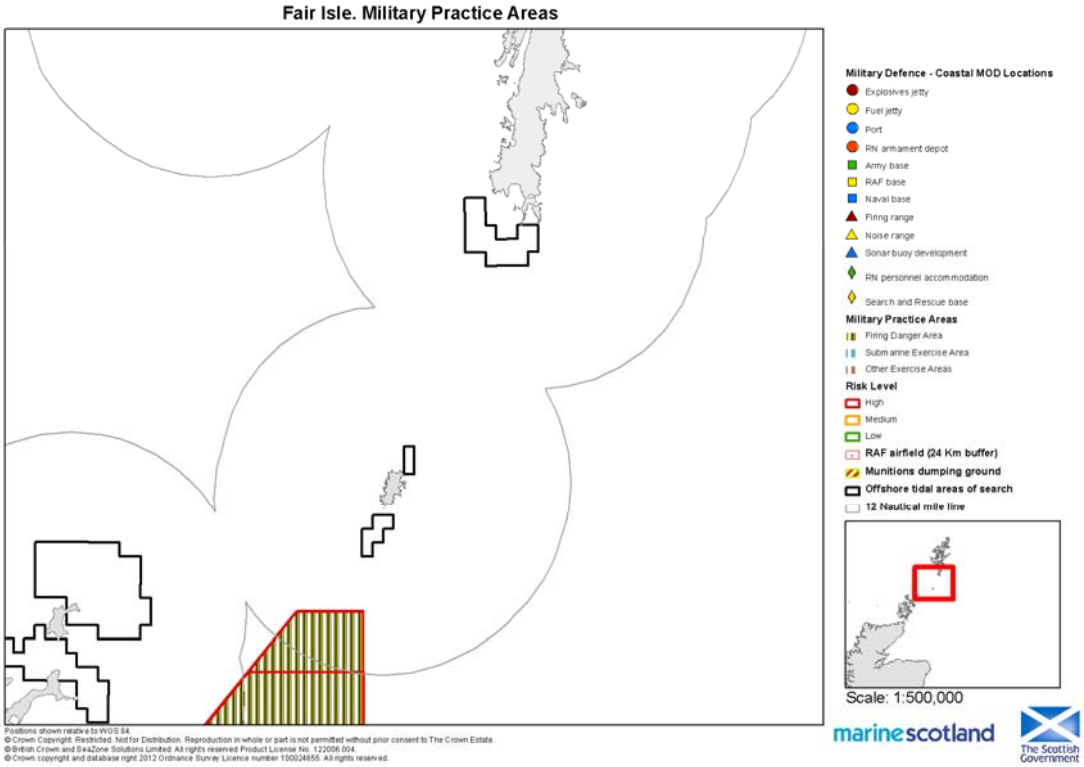


Fig.3.23 Defence activities in the Sumburgh and Fair Isle (Areas of Search)



3.7 Environment

Designations

- Pentland Firth, Orkney and Westray

3.7.1 There are numerous designated sites on and offshore within the Northern Highlands and Orkney. Key sites of relevance include:

- The North Caithness Cliffs SPA, which is protected for its large population of seabirds. It extends from Duncansby Head in the east to Melvich further west along the coast. It is overlaps either partly or wholly with Duncansby Head SSSI, Stroma SSSI, Dunnet Head SSSI, Holborn Head SSSI, and Red Point Coast SSSI. The seaward extension extends approximately 2km into the marine environment to include the seabed, water column and surface. Peregrine Falcon (Annex 1), and migratory species (common buillemot) are supported by the site, as well as large assemblages of a range of other species including Northern fulmar, black-legged kittiwake, razorbill and Atlantic puffin.
- Pentland Firth Islands SPA, which supports a nationally important breeding population of Arctic tern (Annex 1 species). The site is also important for its large assemblage of breeding seabirds.
- Caithness and Sutherland Peatlands SPA is protected as its internationally important habitats support a diverse range of bird

species. The site as a whole supports eight Annex 1 species: red-throated diver, black-throated diver, hen harrier, golden eagle, merlin, golden plover, wood sandpiper and short-eared owl. It also supports an internationally important population of dunlin. Caithness and Sutherland Peatlands SAC which is protected for a range of features including its extensive blanket bog and peat habitats, wet mires, heathland, water features, Otter and Marsh saxifrage. The site also overlaps with numerous individual SSSIs.

- There are also several MPA areas of search located offshore to the north of the area, which could be of relevance but are less likely to be directly affected by proposals for development in these areas.
- West Westray, Papa Westray, Calf of Eday, East Sanday Coast, Marwick Head and Rousay SPAs all at the northern end of the islands, supporting a range of seabird species. Other sites, such as Orkney Mainland Moors are further inland and support other bird species which are less closely reliant on the marine environment.
- SACs of greatest relevance to the initial area of search include Sanday, which is an extensive area, designated for its marine habitats, and which has common seals as a qualifying feature. In addition, Faray and Holm of Faray SAC which is designated for grey seals.
- The SACs and SPAs, and some further areas are also designated as SSSIs.
- Possible MPA locations have been identified for further assessment around Papa Westray, due to its interest for black guillemot, and at north west Orkney, and Mousa in Shetland, due to their role in supporting sandeels.

Fig.3.24 Designated Sites in the Pentland Firth (Areas of Search)

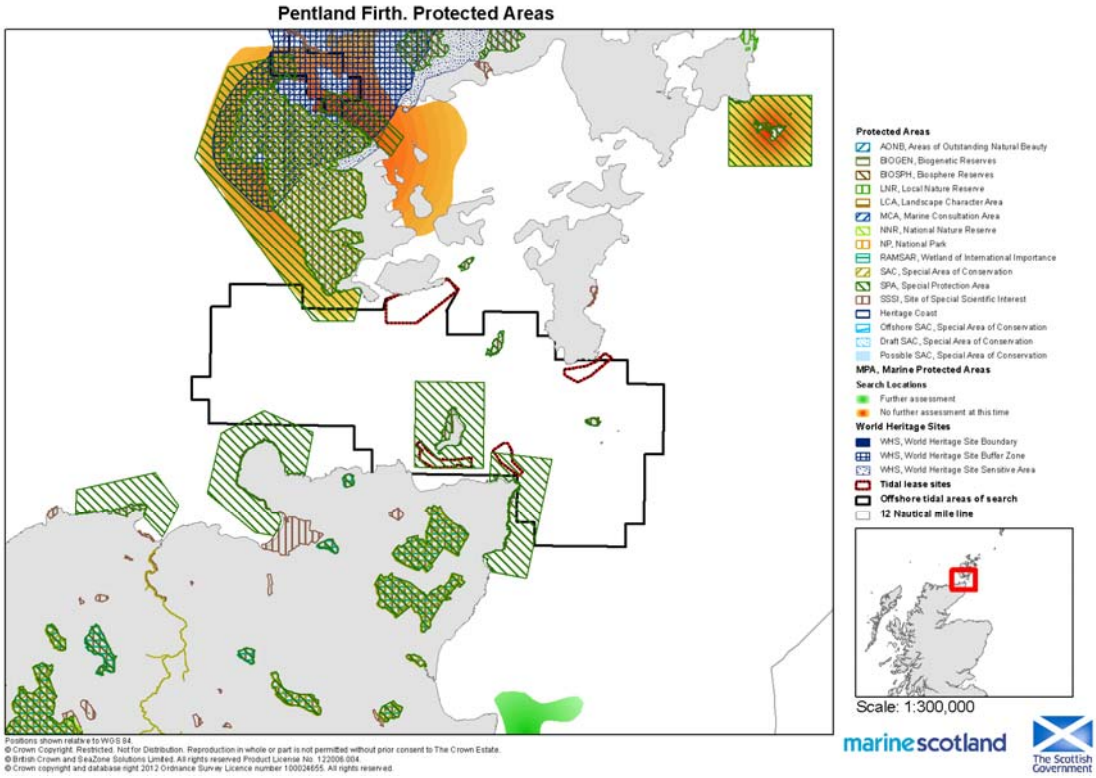
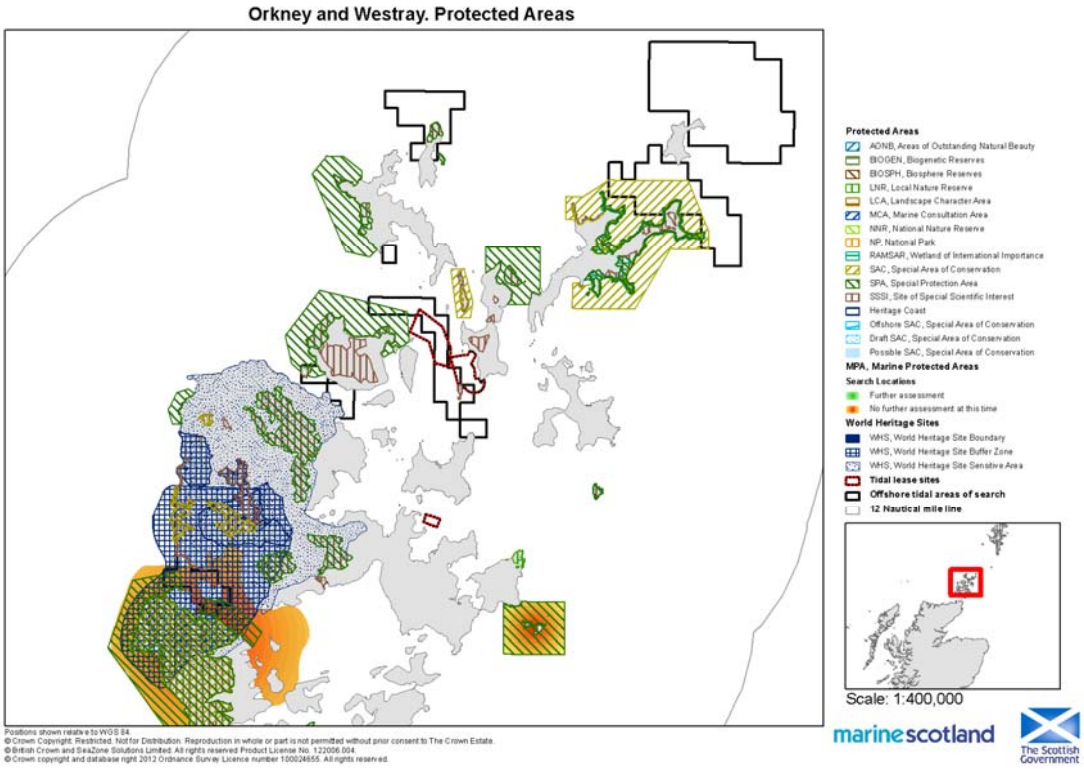


Fig.3.25 Designated Sites in the Orkney and Westray (Areas of Search)



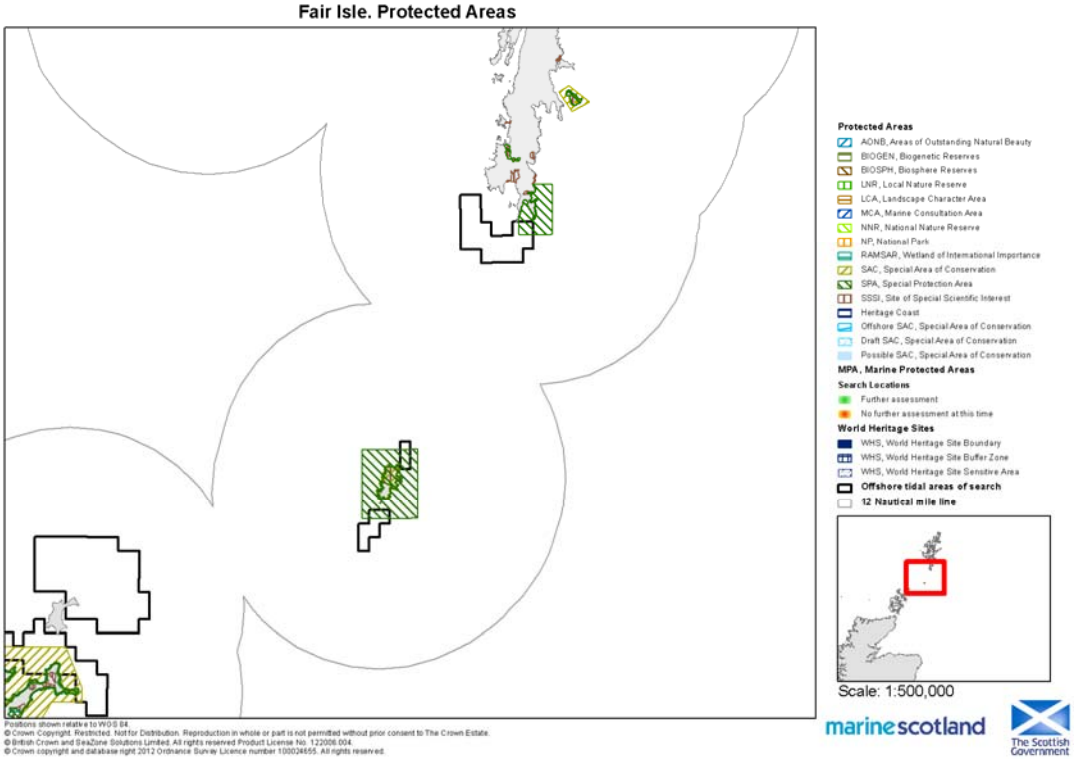
- *Sumburgh & Fair Isle*

3.7.2 Around Shetland, key sites of interest include:

- Pobie Bank Reef possible / candidate SAC (pSAC) lies to the east of the islands, partly overlapping with the eastern area of search. It is a reef habitat, approximately 70km long and 20km wide which supports an extensive community of encrusting and robust sponges and bryozoans. Harbour porpoise, grey seal and harbour (common) seal are present in the area, but are non qualifying features.
- SPAs include Hermaness, Saxa Vord and Valla Field, Fetlar, Otterswick and Graveland, Ronas Hill (North Roe and Tingan) Papa Stour, Foula, Mousa, Noss, and Sumburgh Head. All of these sites have been designated for their interests for birds, including large assemblages of seabirds. Fair Isle SPA also lies to the south of the region.
- Papa Stour, Mousa, North Fetlar, Ronas Hill are also designated as SACs. Further SACs exist on Shetland both on the coast and inland, including East Mires and Lumbister, Sullom Voe, Yell Sound Coast, and the Vadills. These sustain a range of habitats, including coastal features and bog.
- These sites are generally also recognised as SSSIs, and there are some further areas with this status which do not have European protection. There are a total of 31 SSSIs of geological interest, and 29 designated for biological interest.
- An extensive area to the north west of Shetland, and a smaller area to the immediate east of Yell and Unst have been included as search areas for possible future Marine Protected Areas. The former is the Faroe

Shetland Channel, recognised for its role in supporting, habitats such as muds, sands and gravels and its aggregations of deep sea sponges. The latter partly overlaps with Fetlar SPA, and is of interest due to its horse mussel beds, maerl beds, shallow tide-swept coarse sands with burrowing bivalves and black guillemot.

Fig.3.26 Designated Sites in the Sumburgh and Fair Isle (Areas of Search)



Landscape Desigations – Regional Overview

3.7.3 Areas of search identified at scoping extend around the Shetland Isles. Development proposals would need to take into account potential impacts on the special qualities of these areas.

3.7.4 The Shetland National Scenic Area includes seven areas that have a predominantly coastal character. SNH provides a description of its special qualities.[1] The designation includes Fair Isle, Foula, South West Mainland, Muckle Roe, Esha Ness, Fethaland and Herma Ness. All of these areas are valued for features including: *the stunning variety of the extensive coastline, coastal views (close and distance), coastal settlement*, the landform creating *hidden coasts, the effects of wind and shelter, the sense of remoteness, solitude and tranquillity, coastal stacks, promontories and cliffs*, *northern light* and effects on views and experience of the landscape, and *distinctive cultural landmarks*.

[1] http://www.snh.gov.uk/docs/B699717.pdf

3.7.5 Shetland became a member of the European Geoparks Network and the UNESCO Global Geoparks Network in recognition of its internationally significant geodiversity. Although not specifically a landscape designation, it the significant role the geology of the islands plays in the landscape experience, which is often particularly evident at the coast.

3.7.6 Areas of search identified at scoping are focused on the western seaboard, are close to the Orkney NSA, and West Mainland Local Landscape Area, therefore development proposals would need to take into account potential impacts on the special qualities of these areas.

3.7.7 Orkney has a NSA on **Hoy and the West Mainland**. Its special qualities[2] include its *landscape setting for the archaeological World Heritage site*, the *layering of geology*, *topography, archaeology and land use*, the *presence of sandstone and flagstone* through archaeology and natural exposure. The *spectacular coastal scenery,* the strong presence of *curves and lines* is set against the backdrop of *constantly changing land and water*. *Long settled* human presence is apparent in the buildings and cultivation of the landscape, supported by the *productive land and sea*. Location specific qualities include the *high hills of Hoy* which form a backdrop to much of the West Mainland, the *townscape of Stromness, its setting and link with the sea* and the *traditional buildings and crofting patterns of Rackwick*.

3.7.8 The Orkney Islands Council has identified four Local Landscape Areas[3], which support Policy N1 of the Orkney Local Development Plan, and are set out in Supplementary Guidance[4] supported by descriptions of their key characteristics[5].

3.7.9 The key characteristics of the Local Landscape Area of **Denwick and Mull Head** include the high, eroded cliffs and associated landform features, and range of seabirds and plant communities. The area of Mull Head is also noted for its wild qualities. **East Holm to Weddell, Burray** is significant in relation to the strategic role it played during World War II, notably the man made features of the Churchill Barriers, and the Italian Chapel. The landscape is a significant element of the experience when crossing the barriers, which is undertaken by many visitors to Orkney. **Ignaness Bay** is noted for its sandy bays with intervening rocky coastline and low cliffs, and two brackish lochs are found at Swarsquoy. **St Peter's Pool and Dingieshowe** comprises the unusual geomorphology of a shingle ayre, areas of sandy beach, dunes, bay and sand flats, and exposed cliffs.

[2] http://www.snh.gov.uk/docs/B699719.pdf
[3] Local Landscape Designations replace the Areas of Great Landscape Value and Areas of Attractive Settled Landscape designations set out in the Orkney Local Plan 2004
[4] Orkney Islands Council (2011) Landscape Character and Designations Supplementary Guidance April 2011 [available online] http://www.orkney.gov.uk/Files/Planning/Development-Planning/Landscape%20Character%20and%20Designations.pdf
[5] Orkney Local Landscape Area descriptions, available from http://www.orkney.gov.uk/Service-Directory/R/local-landscape-areas.htm

3.7.10 The Kyle of Tongue National Scenic Area is located on the Northern Highland Coastline. Its special qualities include its rich variety of coastal scenery, its role in linking an inhabited coast to a wild moorland, and the constantly changing character of the Kyle.

3.7.11 The Highland Council has identified 5 special landscape areas along the Northern Highland Coast:

- Oldshoremore, Cape Wrath and Durness: This extends along the coastline from Cape Wrath in the west to Durness in the east. The coastal character of the area (including bays, inter-tidal areas cliffs and dunes) and its sense of remoteness and extremity are key parts of its special qualities.
- Eriboll East and Whiten Head: On the north coast of Sutherland. This area's cliffscapes, open coastal waters and sheltered loch (taking in the eastern shore of Loch Eriboll) are key features. Remoteness is also a key part of the area's special qualities.
- Farr Bay, Strathy and Portskerra: This extends from Bettyhill to Melvich, and includes moorland and crofting areas. The area's coastline, rocky headlands, sheltered bays are all key features. Views to the sea and along the coast are also recognised as important parts of the area's special qualities.
- Dunnet Head: This area covers the Dunnet Head Peninsula and Dunnet Bay, the most northerly point of mainland Britain. The prominent headland and cliffs, and relationship between land and sea are all key features. Views to Orkney and along the northern coast are also essential components.
- Duncansby Head. This lies to the eat of John o'Groats, and includes Duncansby Head and the Stacks of Duncansby. This area's cliffs and its northerly character are essential components of its special qualities.

3.7.12 Development proposals within the offshore areas of search identified at scoping, would need to take into account potential impacts on the special qualities of these areas.

Marine mammals, Basking Sharks and Seals

- Pentland Firth

3.7.13 Sightings of marine mammals within this area inlcude: white beaked dolphins, harbour porpoise, and given the proximity to the Moray Firth SAC some bottlenose dolphins will have to be considered also when planning environmental interactions.

3.7.14 No seal SACs exist in the vicinity of the pentland Firth tidal area of search.

3.7.15 But Seal haul out sites have been identified at Gills bay, Strona Isle north, Mell head Skerries, Pentland Skerries, Muckle Skerry all for grey seal and one ay Ness Quoys for common seal.

3.7.16 Basking shark sightings are low and only a small number have been recorded each year.

- Orkney & Westray

3.7.17 Sightings of marine mammals on average within the tidal areas of search around Orkney are low to moderate with more encounters seen towards the west. Species that are regularly sighted around Orkney inlcude: minke whale to the north of the islands, white beaked dolphins and harbour porpoise.

3.7.18 SACs have been implemented for grey seals at Faray and Holm of Faray and for common seals at Sanday.

3.7.19 The two uninhabited islands of Faray and Holm of Faray in the northern part of Orkney support a well-established grey seal breeding colony. The seals tend to be found in areas where there is easy access from the shore, and freshwater pools on the islands appear to be particularly important. The islands support the second-largest breeding colony in the UK, contributing around 9% of annual UK pup production.

3.7.20 Sanday is situated in the north-east of the Orkney archipelago and supports the largest group of common seal at any discrete site in Scotland. The breeding groups, found on intertidal haul-out sites that are unevenly distributed around the Sanday coast, represent over 4% of the UK population. Nearshore kelp beds that surround Sanday are important foraging areas for the seals, and the colony is linked to a very large surrounding population in the Orkney archipelago (JNCC).

3.7.21 Seal haul-outs for common seals number 21 and are are found within the tidal search areas between Hoy and Mainland, Mainland and Rousay, and north east of Sanday. Haul-out sites for grey seals are found within the tidal area of search in North Westray and East Papa Westray and at North Ronaldsay. One mixed site exists at East Papa Westray also.

3.7.22 Other seal haul-out sites exist around Orkney that do not spatially overlap with tidal areas of search but will stilll have to be considered in a marine spatial planning context and for the development of environmental assessments. In total in the Orkney archipelago there are 28 seal haul-out sites.

3.7.23 The sightings data show that there has been a small number of sightings spread around Orkney in the last 15 years with no discernable hotspots.

- Fair Isle and Sumburgh

3.7.24 Harbour porpoises are common in these areas as they are in most Scottish waters.Sightings of white beaked and white sided dolphins are also common. At these latitudes rarer species can be seen and a moderate level

of sightings can be expected of species like orca, usually associated withthe mackerel fishery, and minke whale and also the occasional humpback whale in the summer months. A number of Risso's dolphin have also been sighted at Fair isle, Noss and Mousa and also sperm and pilot whales have been recorded.

3.7.25 All this potential for activity has contributed to a growing sea mammal tourist industry in the Isles that attracts a great diversity of tourists.

3.7.26 Sightings have been recorded close to the location of the Sumburgh Head tidal area of search.

3.7.27 Given the current extent of the Sumburgh Head tidal are of search it will be expected that cetacean interactions in this locality will have to be investigated further.

3.7.28 A seal SAC for common seals lies north of the tidal Sumburgh Head area of search at Mousa on the west of Shetland. This SAC has been designated for common seals and protects this species during pupping breeding and moulting.

3.7.29 Directly north of the Sumburgh Head area of search are three haul-out sites for grey seal at Ladies Holm, Siggar Ness and Horse Island. Further north on the east and west sides there are four common seal haul-out sites at Colsay in the east and three other locations close to the Mousa SAC in the west.

3.7.30 No SACs or seal haul-out siteshave been sited at Fair Isle.

3.7.31 Only occasional sightings have been recorded of this species within these two sites.

Fig.3.27 Cetaceans, Seals and Basking Sharks in Pentland Firth (Area of Search)

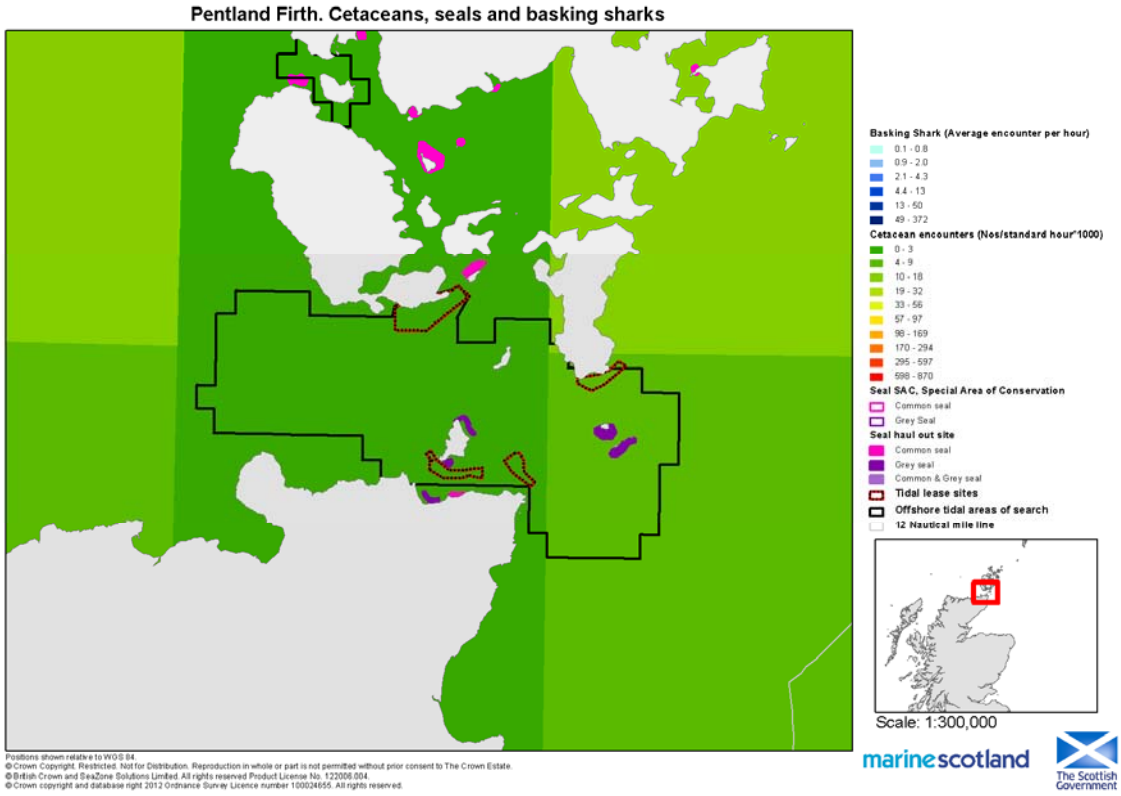


Fig.3.28 Cetaceans, Seals and Basking Sharks in Orkney and Westray (Areas of Search)

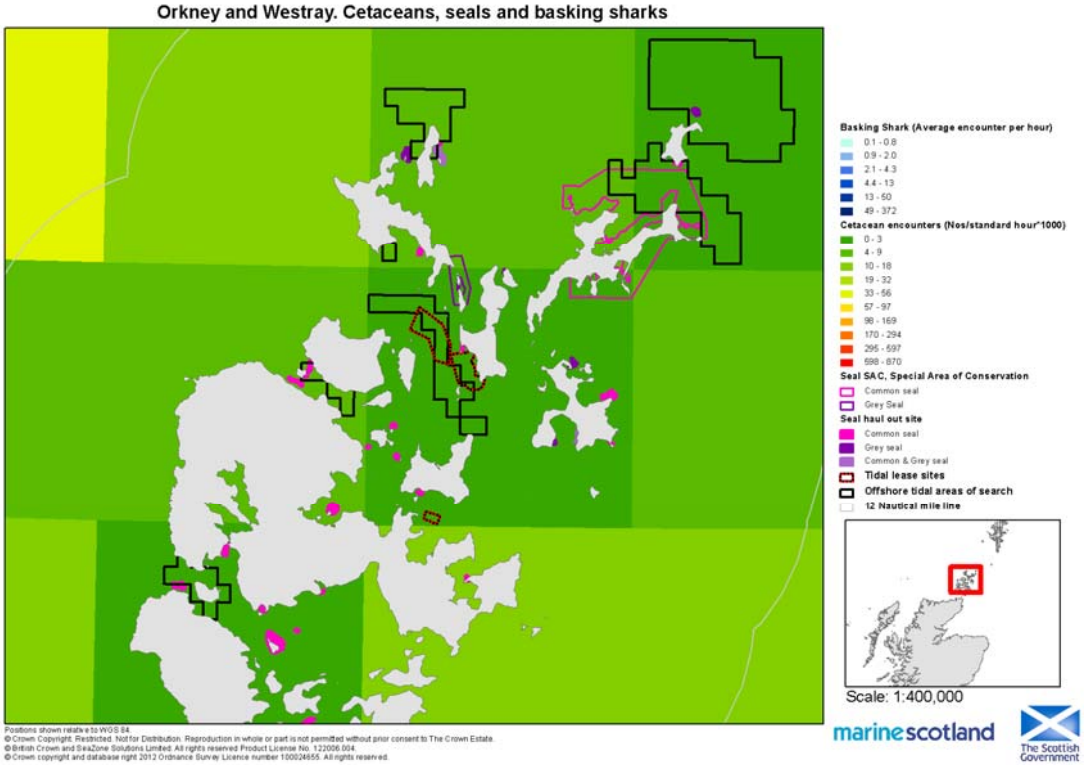
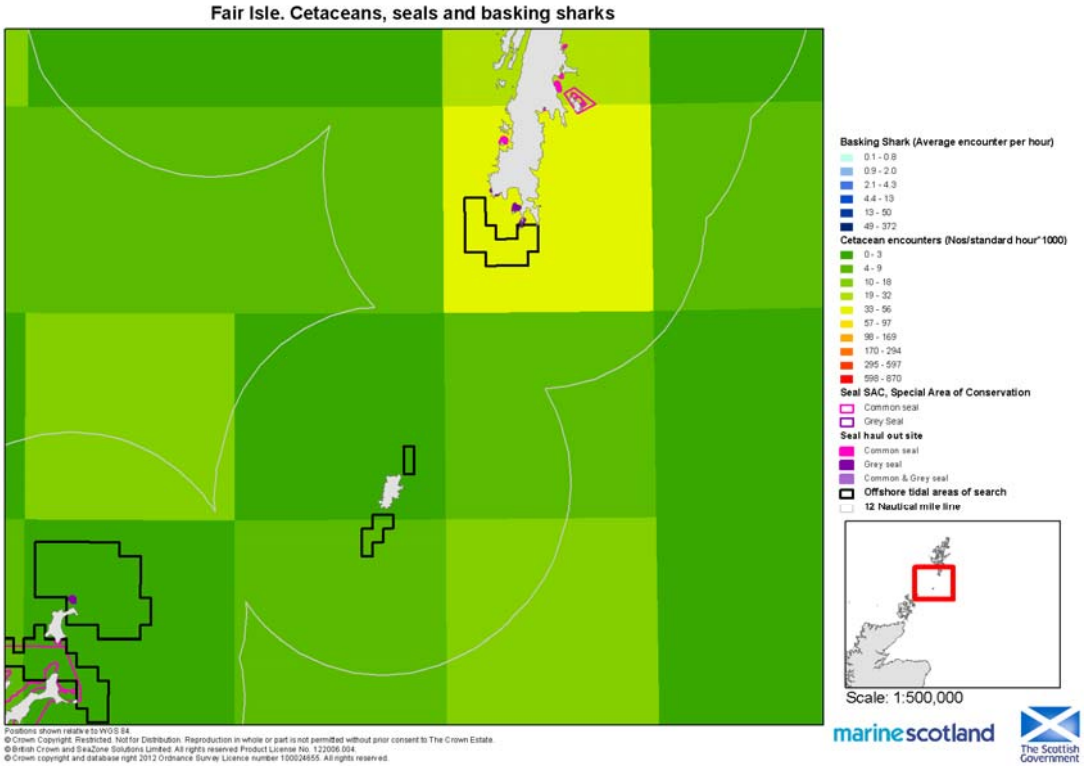


Fig.3.29 Cetaceans, Seals and Basking Sharks in Sumburgh and Fair Isle (Areas of Search)



Seabirds

- Pentland Firth

3.7.32 Seabird proportional density by species is relatively high within the Pentland Firth tidal area of search, the extent of which includes one whole SPA at Stroma Isle and a segment of two others at the east and west North Caithness cliffs.

3.7.33 The general area around Orkney itself is an important site for many species like Black legged Kittywake, common guillemot atlantic puffin, european shag, fulmars, razorbills and black guillemots,and arctic terns. (ESAS report, 2010).

3.7.34 This is a sensitive environment where seabird population numbers and breeding success are tightly linked with fish prey such as sandeels. In recent years, there has been a sharp decrease in the abundance of species like guillemots and kittywakes (Charting progress 2).

- Orkney & Westray

3.7.35 There are six SPAs in Orkney. The SPAs at Hoy, Rousay, and East Sanday coast all overlap spatially with the tidal area sof search but all the SPAs in Orkney should be considered. The cliffs support large colonies of breeding auks and Kittiwake, whilst the grassland and heathland areas support breeding colonies of skuas and terns.

3.7.36 As well as the diving birds like guillemots, puffins, red throated divers, there are breeding pairs of great skuas, arctic terns and fulmars. Also rarer birds like the bartailed godwit, purple sandpiper and turnstone overwinter in the vicinity of these areas of search.

3.7.37 IBAs have also been established to protect the sensitive Orkney populations. The largest two are in Hoy, where up to 56,000 breeding pairs return regularly and in the mainland near Scapa Flow to protect waterbirds like red necked grebes and eider ducks. IBAs have been established in all the Orkney islands.

3.7.38 Eleven RSPB reserves have been created in Orkney, from Hoy in the south to North Hill in the north and Copinsay in the east.

- Fair Isle & Sumburgh

3.7.39 Both the areas of search at at Fair Isle and Sumburgh Head overlap with an SPA.

3.7.40 Fair Isle supports large colonies of breeding seabirds, and is also important as a stop-over site for migrating birds. It holds 72,400 breeding seabirds and 21,900 breeding waterbirds on a regular basis, and is nationally important for breeding fulmars (35,200 pairs), arctic skuas (87 pairs) and kittywakes (19,300 pairs).

3.7.41 Fair Isle also has an endemic subspecies of eurasian wren.

3.7.42 In Sumburgh head during the breeding season, this location regularly supports 35,000 individual seabirds including: Guillemot, Kittiwake, Fulmar, Arctic Tern, (JNCC)

3.7.43 IBAs also exist at both of these locations and have been created to protect the native and migrating breeding seabird colonies.

3.7.44 Eighteen RSPB reserves exist in this whole North region from Dunnet head to Sumburgh Head. Apart from Hoy Hobbister and Mainland they are small in area.

Fig.3.30 Seabirds, Important Bird Areas and RSPB Reserves (Winter) in Pentland Firth (Area of Search)

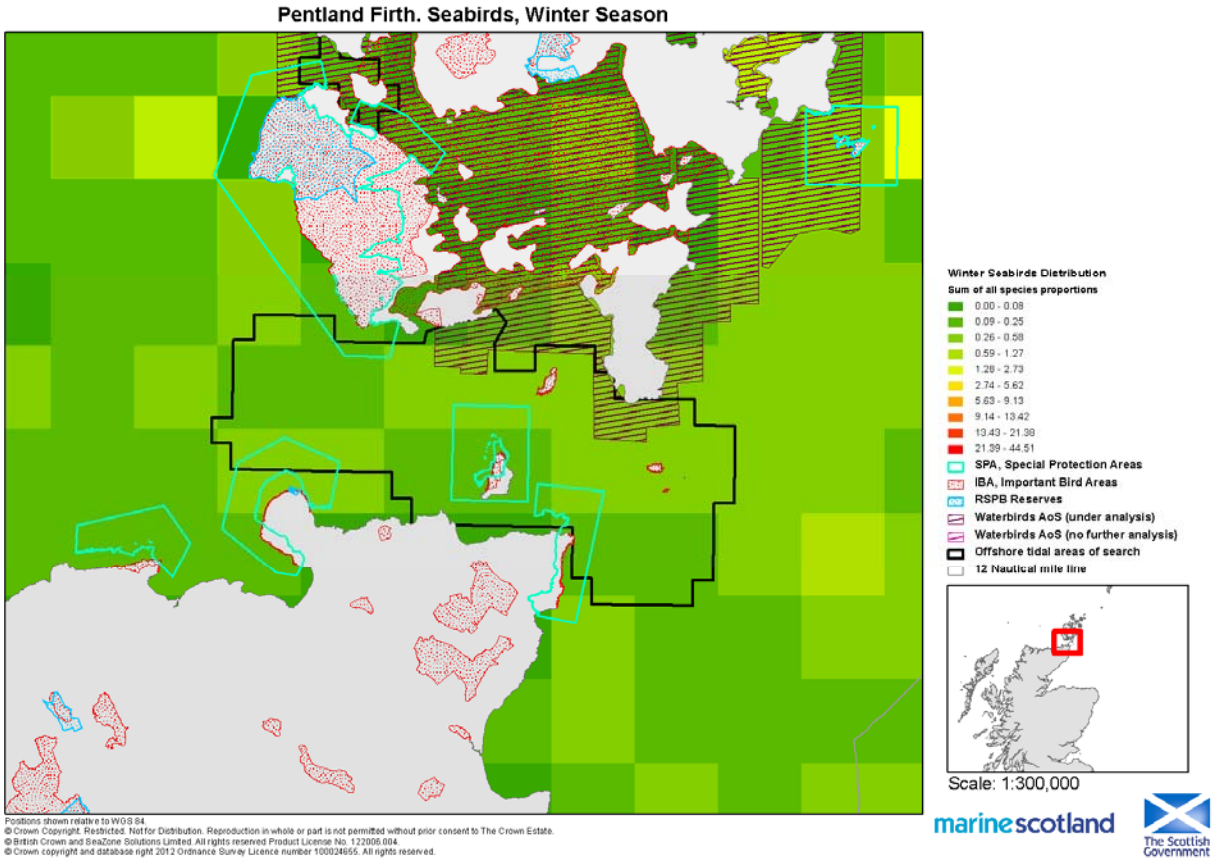


Fig.3.31 Seabirds, Important Bird Areas and RSPB Reserves (Breeding) in Pentland Firth (Area of Search)

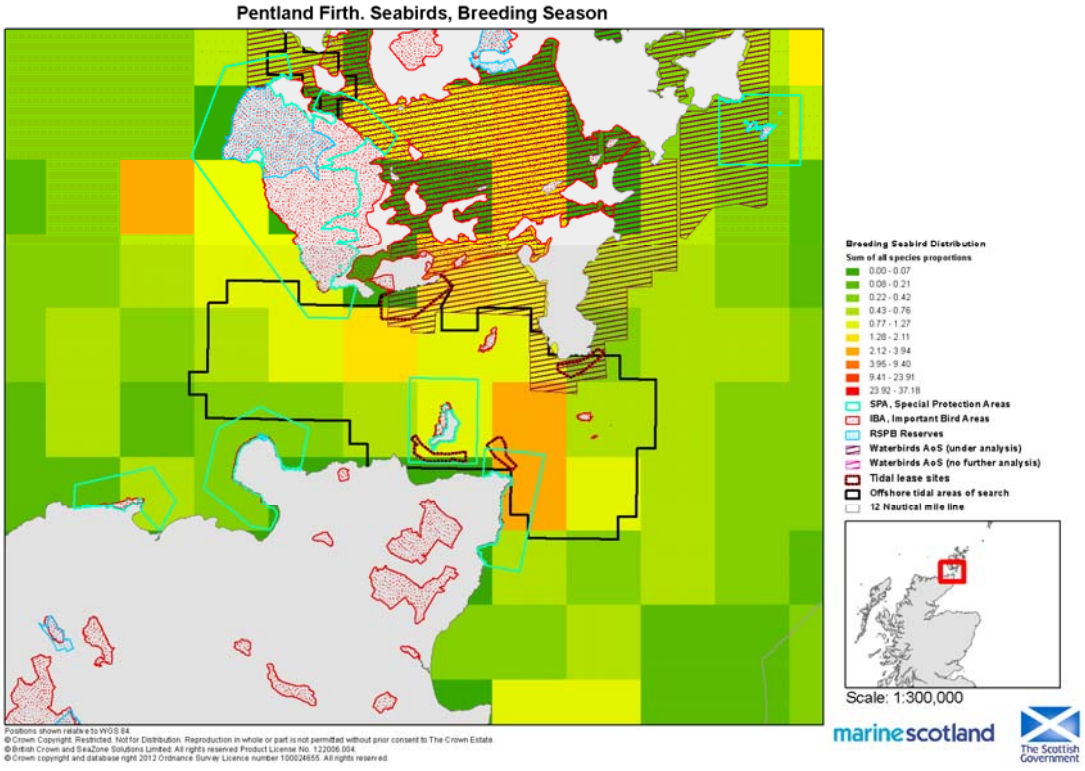


Fig.3.32 Seabirds, Important Bird Areas and RSPB Reserves (Winter) in Orkney and Westray (Areas of Search)

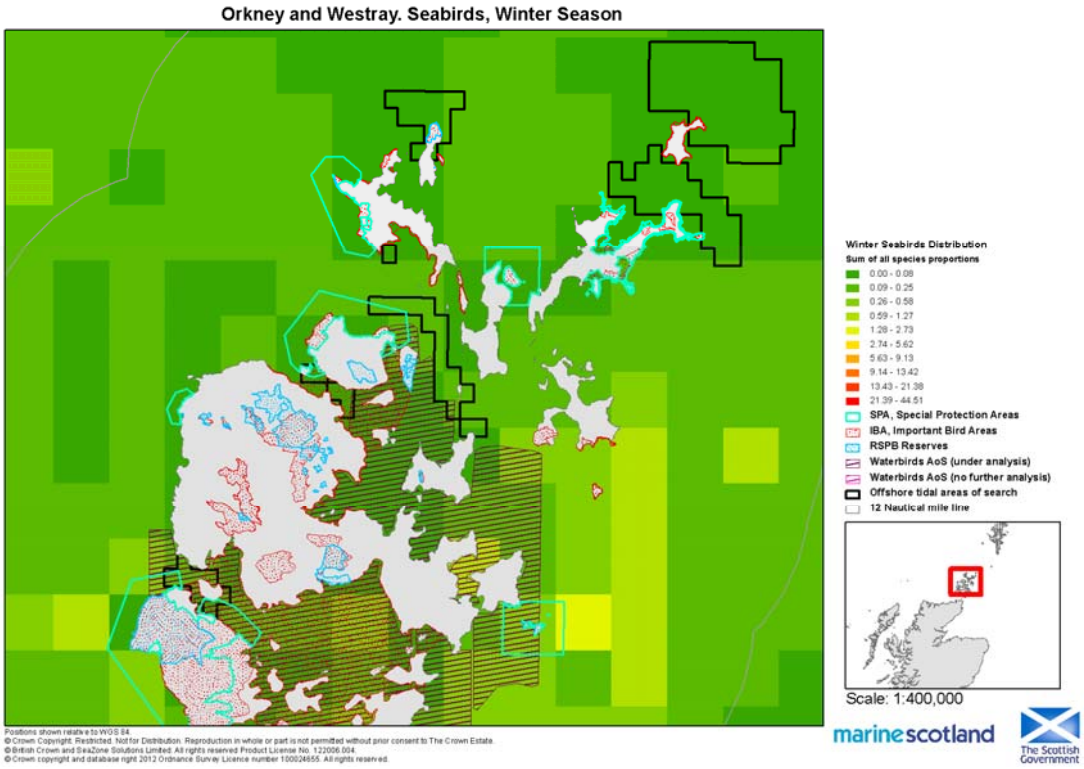


Fig.3.33 Seabirds, Important Bird Areas and RSPB Reserves (Breeding) in Orkney and Westray (Areas of Search)

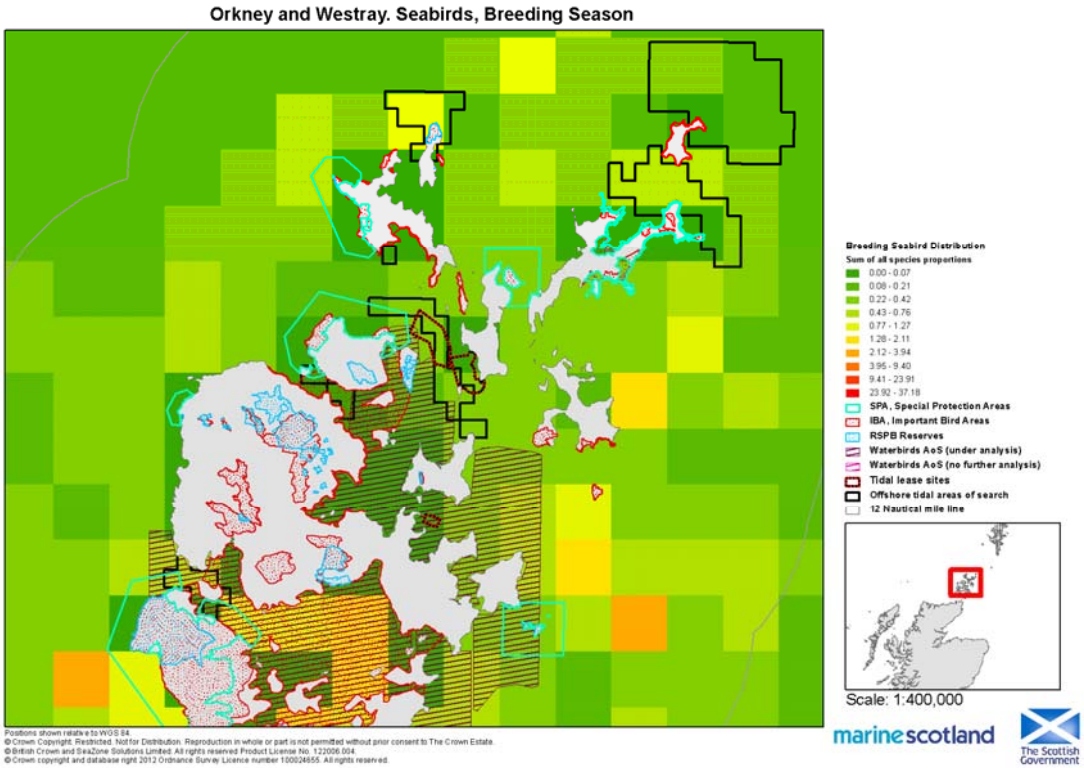


Fig.3.34 Seabirds, Important Bird Areas and RSPB Reserves (Winter) in Sumburgh and Fair Isle (Areas of Search)

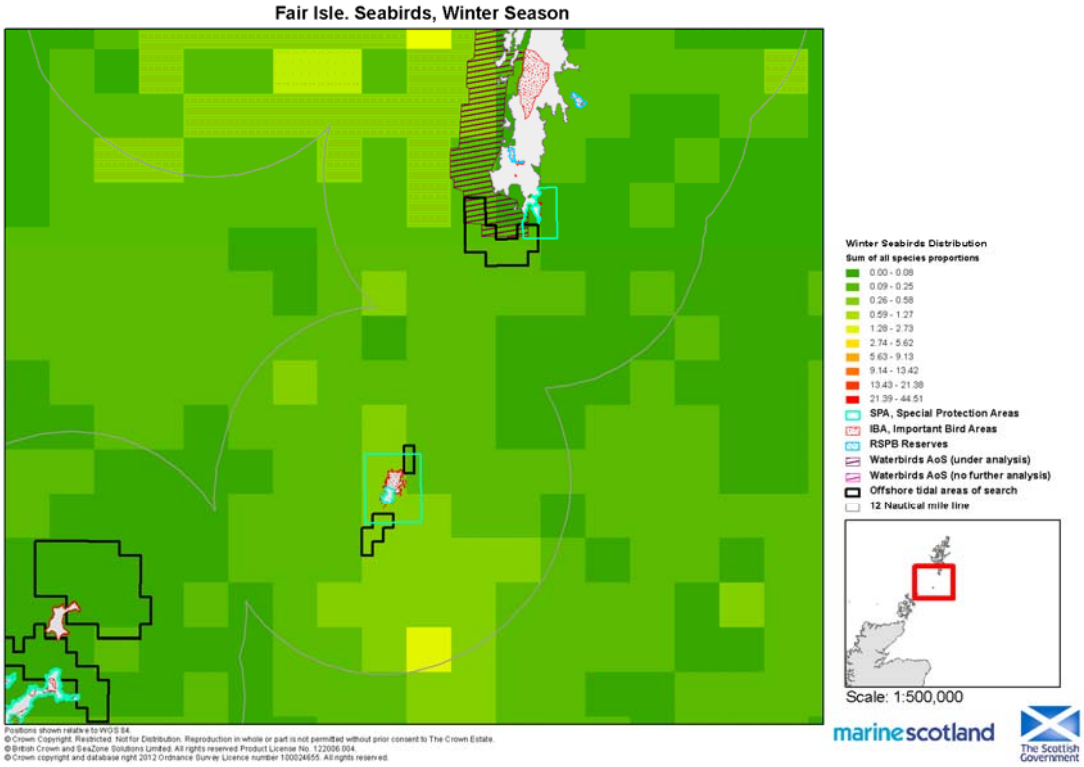
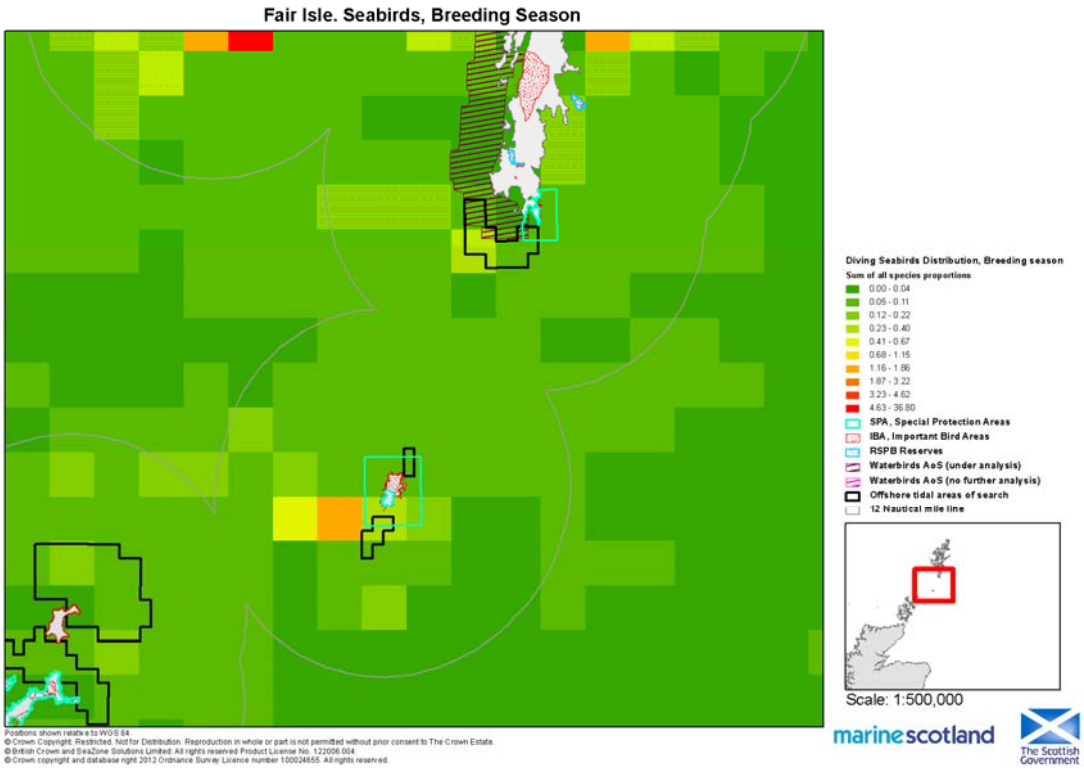


Fig.3.35 Seabirds, Important Bird Areas and RSPB Reserves (Breeding) in Sumburgh and Fair Isle (Areas of Search)



3.8 Fishing

Commercial Fishing Regional Overview

3.8.1 Landings caught by UK vessels within the North SORER had an average annual value of £162 million (42.4% of the Scottish total) and an average annual live weight of 209,200 tonnes (48.8% of the Scottish total) for the ten year period from 2001 to 2010.

3.8.2 The type of species landings from within the North SORER differ significantly between inshore / offshore waters and between different locations within this region. Inshore, and particularly around the islands, shellfish account for the majority of the value and volume of species landed whereas offshore, the value and volume of landings are mainly pelagic and demersal species.

3.8.3 Inshore, landings of scallops and other shellfish (excluding Nephrops) accounted for 57% of the total catch value in 2010 whilst demersal species made up 26% and pelagic species made up 16% of the total catch value. Offshore, landings of mackerel accounted for 36% of the total catch value in 2010, 27% were monkfish haddock and cod (combined), 11% were other whitefish, and herring and Nephrops each accounted for 9% of the total catch value.

3.8.4 In 2010, 41% of the value of landings from inshore waters were taken by vessels 10m and under in length, and 46% were landed by vessels 15m and over; whereas offshore, 94% were landed by vessels 15m and over.

3.8.5 For inshore waters, 34% of the total catch value was taken by pots, 26% by demersal trawl, 18% by dredges and 15% by pelagic trawl; whereas for offshore waters, 45% was taken by pelagic trawls and 37% by demersal trawls.

3.8.6 The main administrative fishing ports in this region are Scrabster, Kirkwall (Orkney) and Lerwick (Shetland) and there are also 28 smaller ports throughout the region.

3.8.7 There are 1025 fishermen employed on Scottish based vessels in these districts (857 of these are based in Orkney and Shetland), with 676 of these employed full-time and 349 part-time. There are 466 active vessels registered in these districts, 355 of which are 10m and under in length.

3.8.8 Shetland has 6% of the total employment in the catching sector in Scotland. The islands of Shetland, Orkney and the Western Isles combined account for 22% of the total catching employment in Scotland. Direct employment in the fishing sector has a whole accounts for between 5% and 10% in Shetland (Baxter et al., 2011)

Area of Search Interactions

3.8.9 The VMS fishing intensity maps give an indication of the amount of fishing activity that takes place and its location. The inshore fishing maps give a general view of the relative values landed, these show in broad strokes where the vessels that do not require VMS transmitter (<15 m in length) fish and provide larger resolution than the VMS maps. Figures 3.36 to 3.50 summarise the fishing types and intensity at the important North sector tidal sites of the Pentland Firth, of Orkney and Westray and Fair Isle and Sumburgh Head.

3.8.10 The areas of search around the Pentland Firth show very little overlap with fishing activity. What fishing is done around the Pentland Firth will be mostly static fishing for lobster and crab. The immense tidal energy of this area precludes most fishing activity.

3.8.11 Within the Orkney isles and Westray region there are seven distinct areas of search. The fishing intensity of VMS vessels is higher for static fisheries like crab and lobster, especially around Sanday and North Ronaldsay where there are two tidal areas of search. Mobile gear in this area is mostly represented by pelagic trawling for herring in the summer and autumn, with some scallop dredge fishing to the south east of Copinsay and some light mobile demersal and nephrops trawling in the general Orkney area.

3.8.12 Further north at the tidal areas of search around Fair Isle and Sumburgh Head the fishing activity that could generate interactions mainly comes from mobile gears both demersal and pelagic as seen in the VMS data maps. The non-VMS vessel maps show little relative value around the Fair Isle site.

Fig.3.36 Fishing Intensity in the Pentland Firth (Area of Search) (Scallop Dredge, Demersal – Mobile Gear, and Nephrops – Mobile Gear)

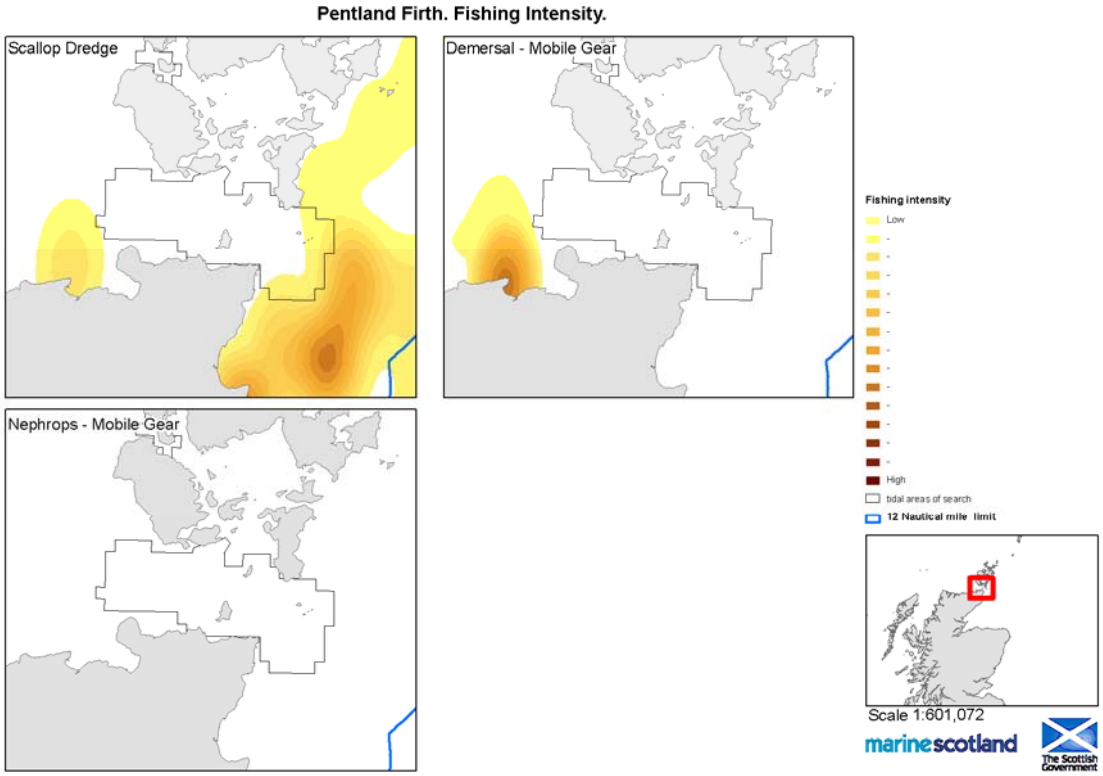


Fig.3.37 Fishing Intensity in the Pentland Firth (Area of Search) (Pelagic, Demersal – Static Gear, Nephrops - Creels)

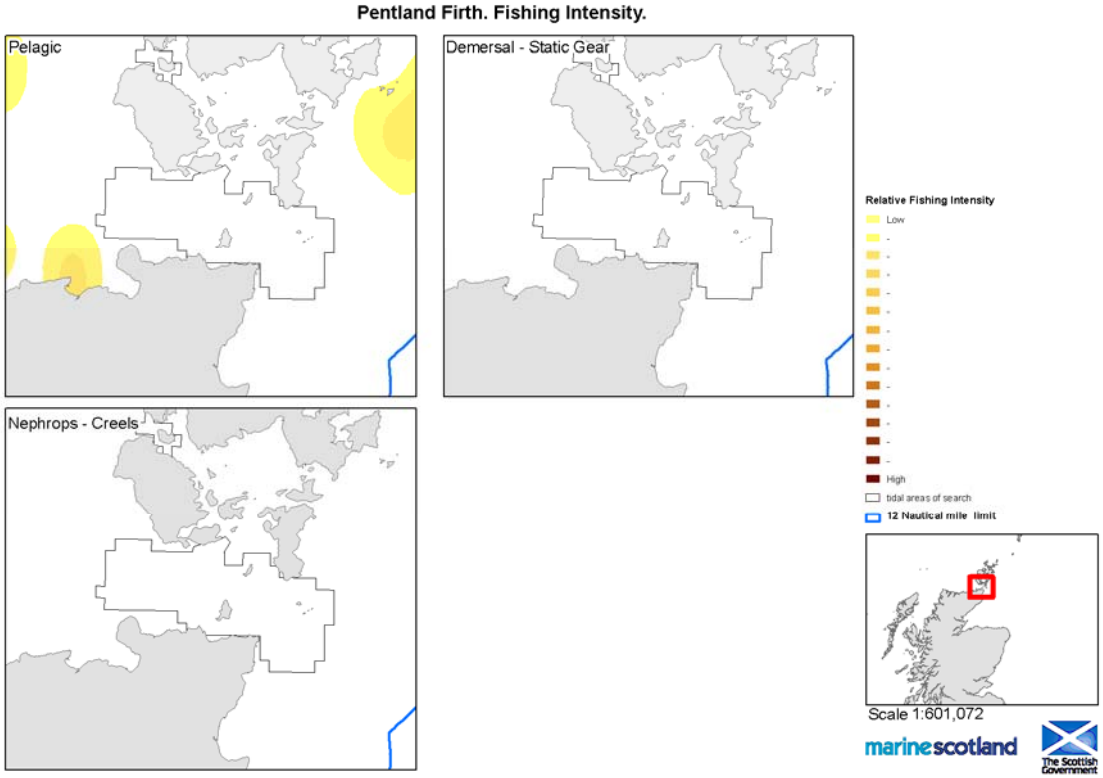


Fig.3.38 Fishing Intensity in the Pentland Firth (Area of Search) (Brown Crab – Creels, Lobster – Creels, Squid)

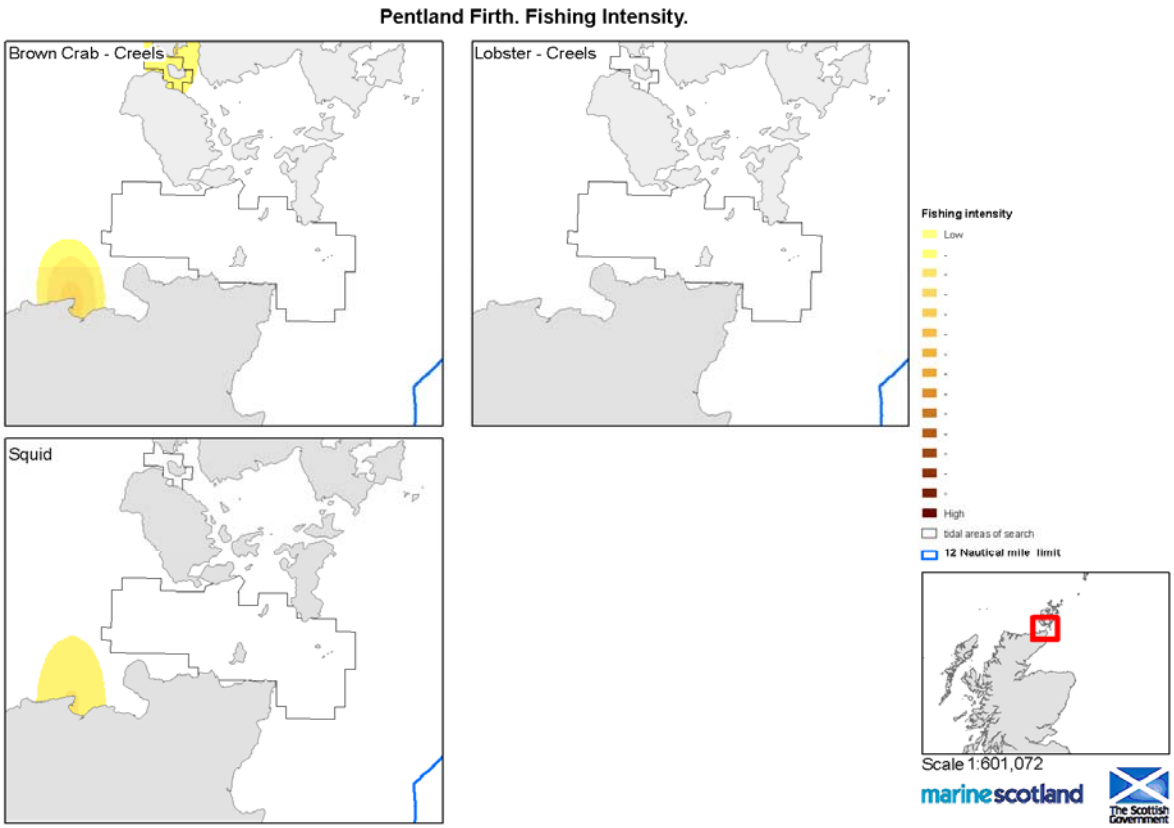


Fig.3.39 Inshore Fisheries in the Pentland Firth (Area of Search) (Mobile Gears)

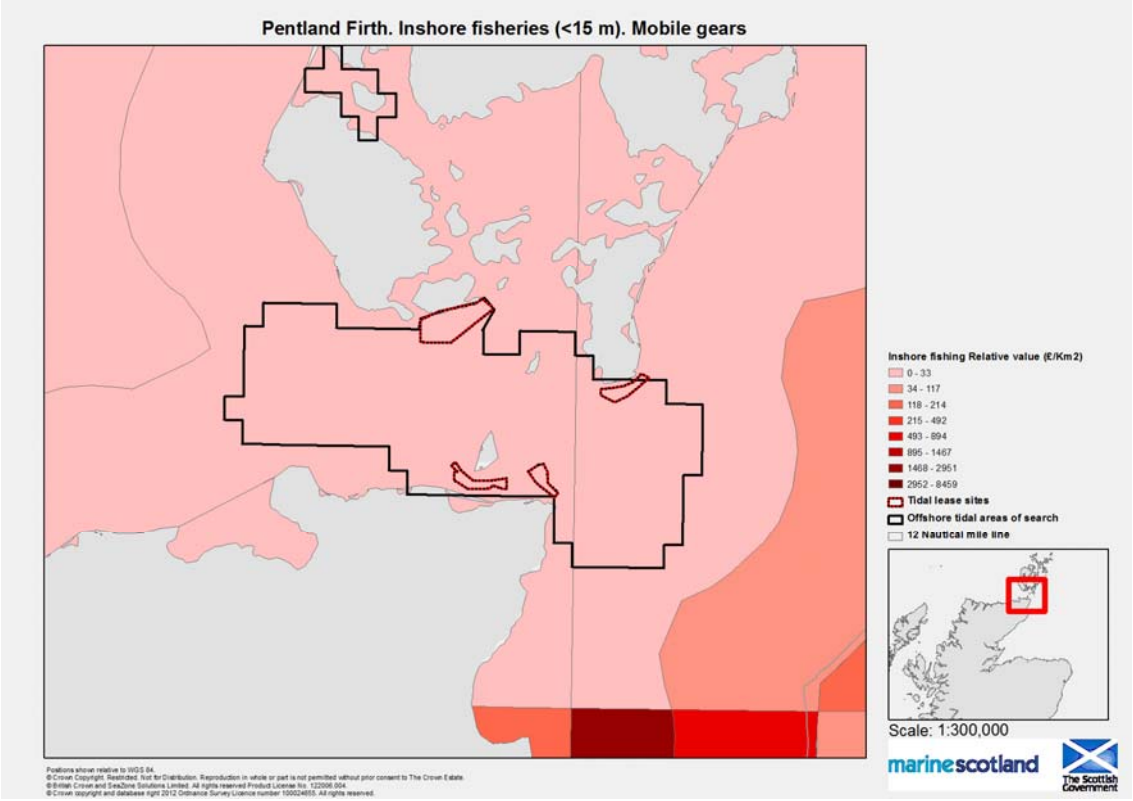


Fig.3.40 Inshore Fisheries in the Pentland Firth (Area of Search) (Static Gears)

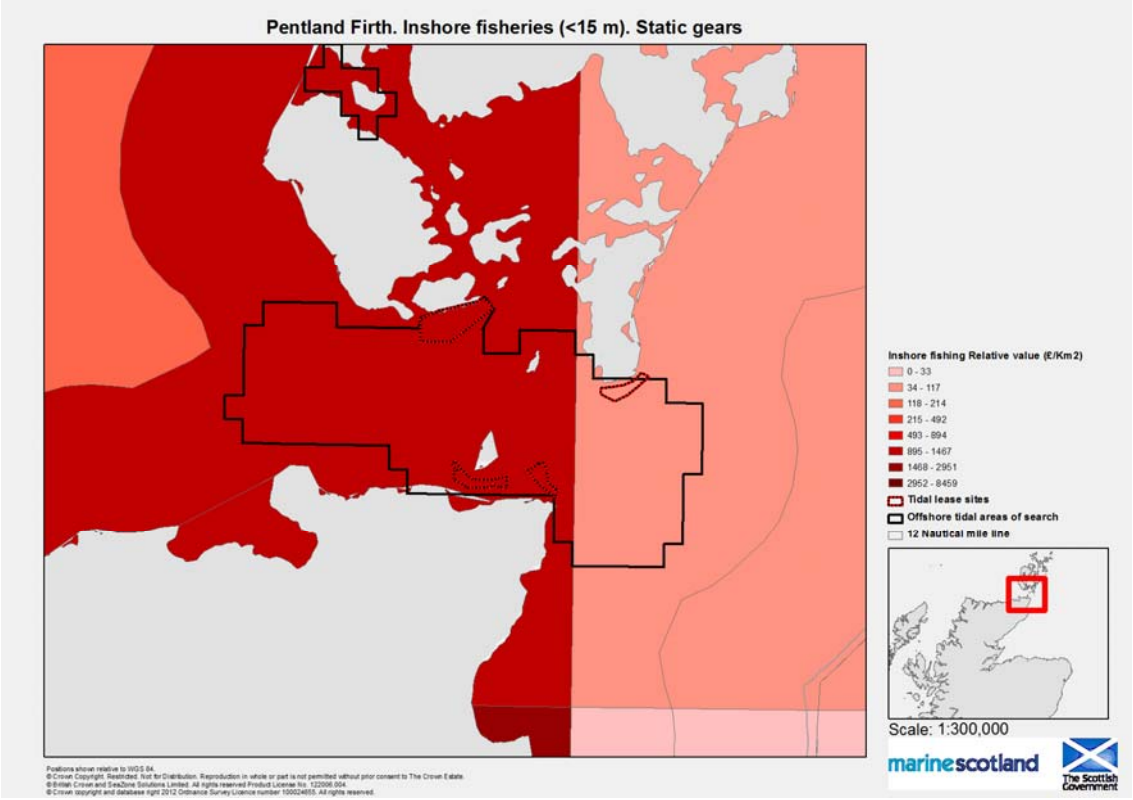


Fig.3.41 Fishing Intensity in the Orkney & Westray (Areas of Search) (Scallop Dredge, Demersal – Mobile Gear, and Nephrops – Mobile Gear)

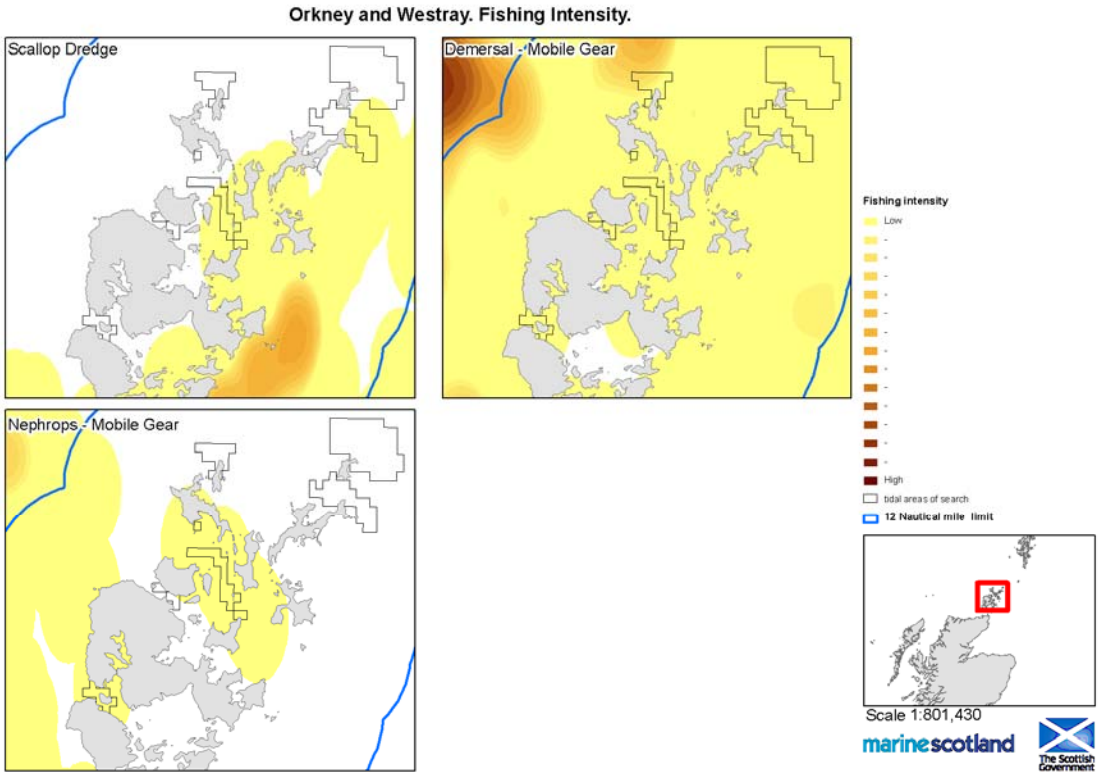


Fig.3.42 Fishing Intensity in the Orkney & Westray (Areas of Search) (Pelagic, Demersal – Static Gear, Nephrops - Creels)

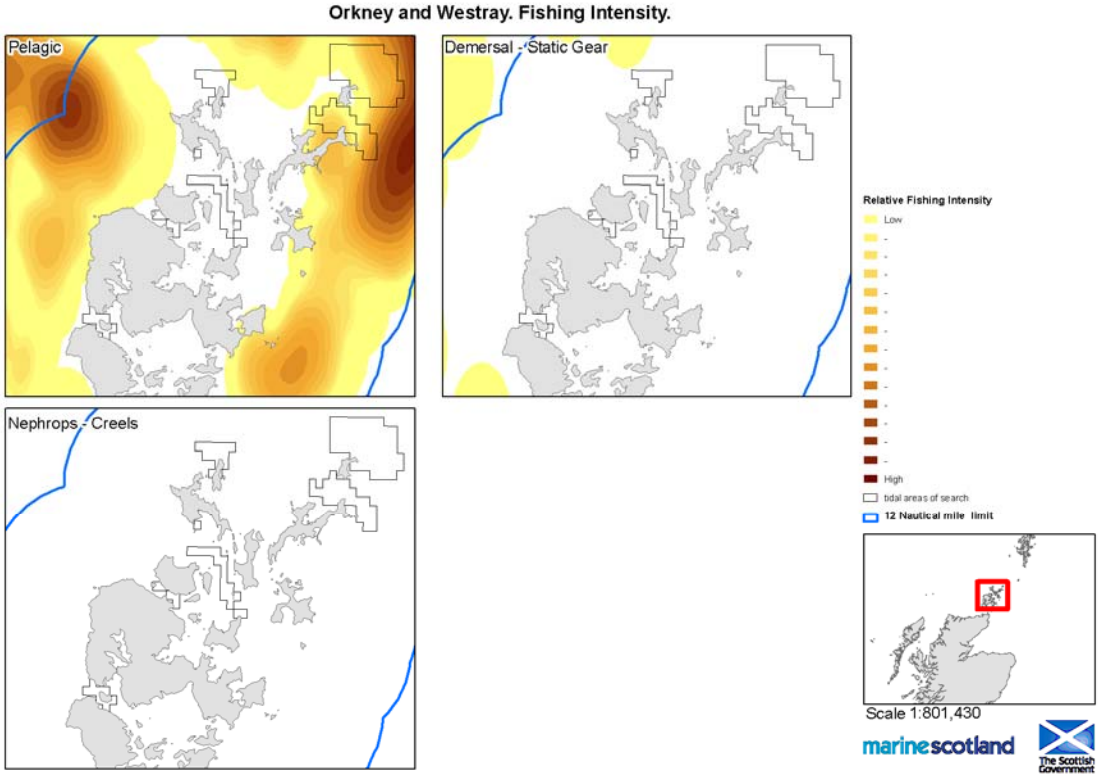


Fig.3.43 Fishing Intensity in the Orkney & Westray (Areas of Search) (Brown Crab – Creels, Lobster – Creels, Squid)

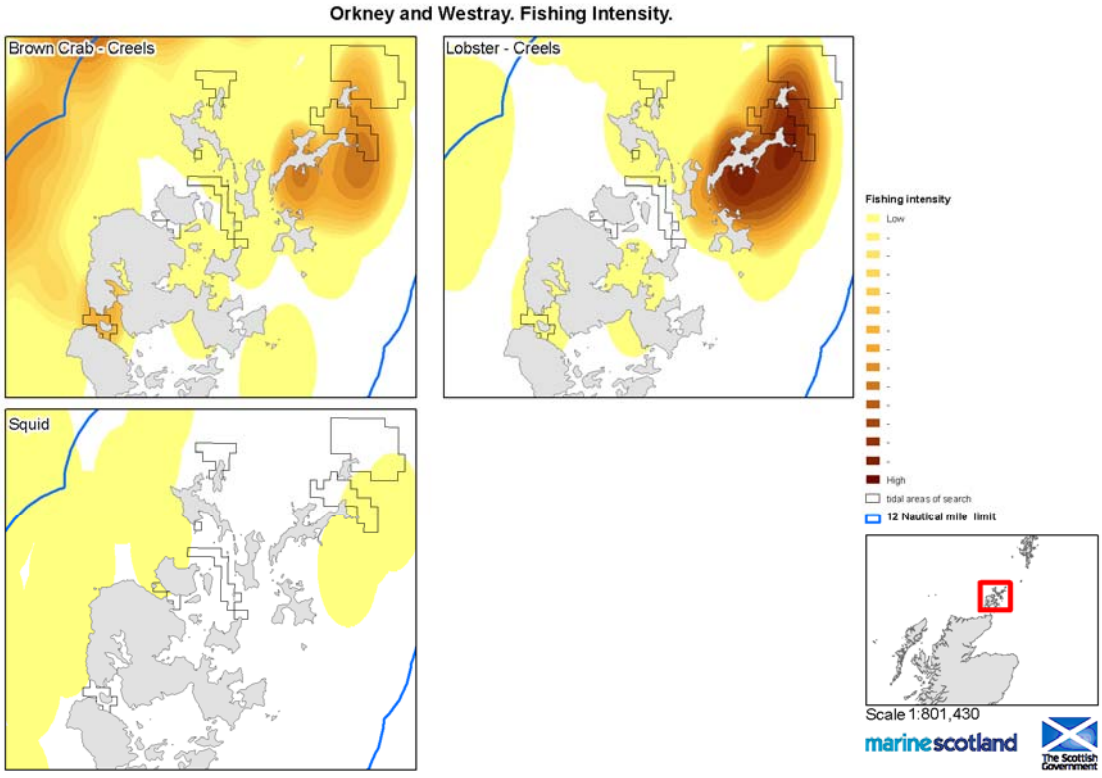


Fig.3.44 Inshore Fisheries in the Orkney & Westray (Areas of Search) (Mobile Gears)

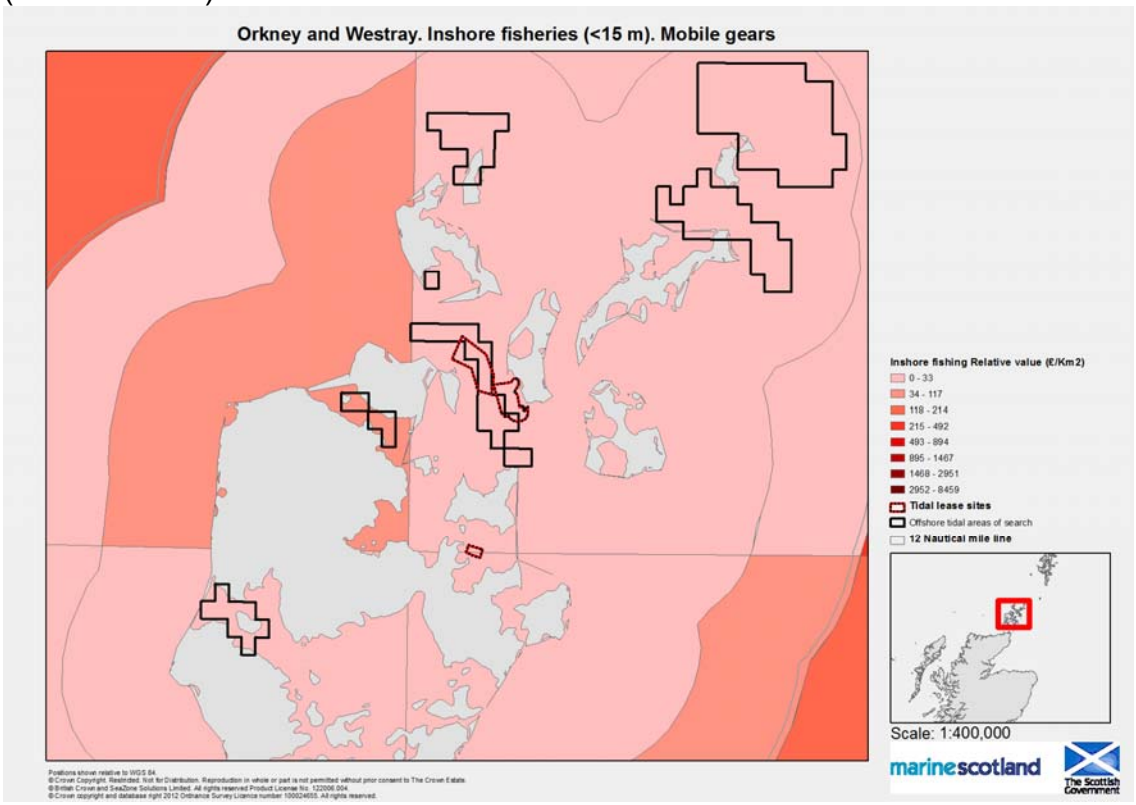


Fig.3.45 Inshore Fisheries in the Orkney & Westray (Areas of Search) (Static Gears)

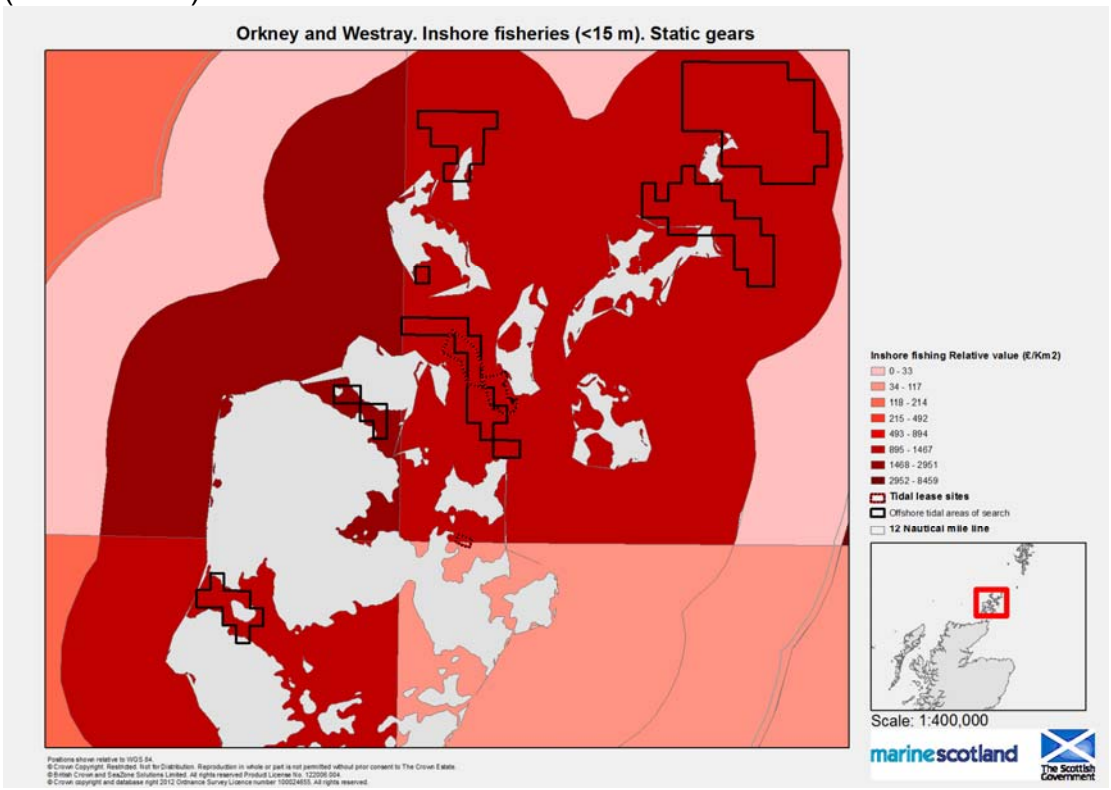


Fig.3.46 Fishing Intensity in the Sumburgh & Fair Isle (Areas of Search) (Scallop Dredge, Demersal – Mobile Gear, and Nephrops – Mobile Gear)

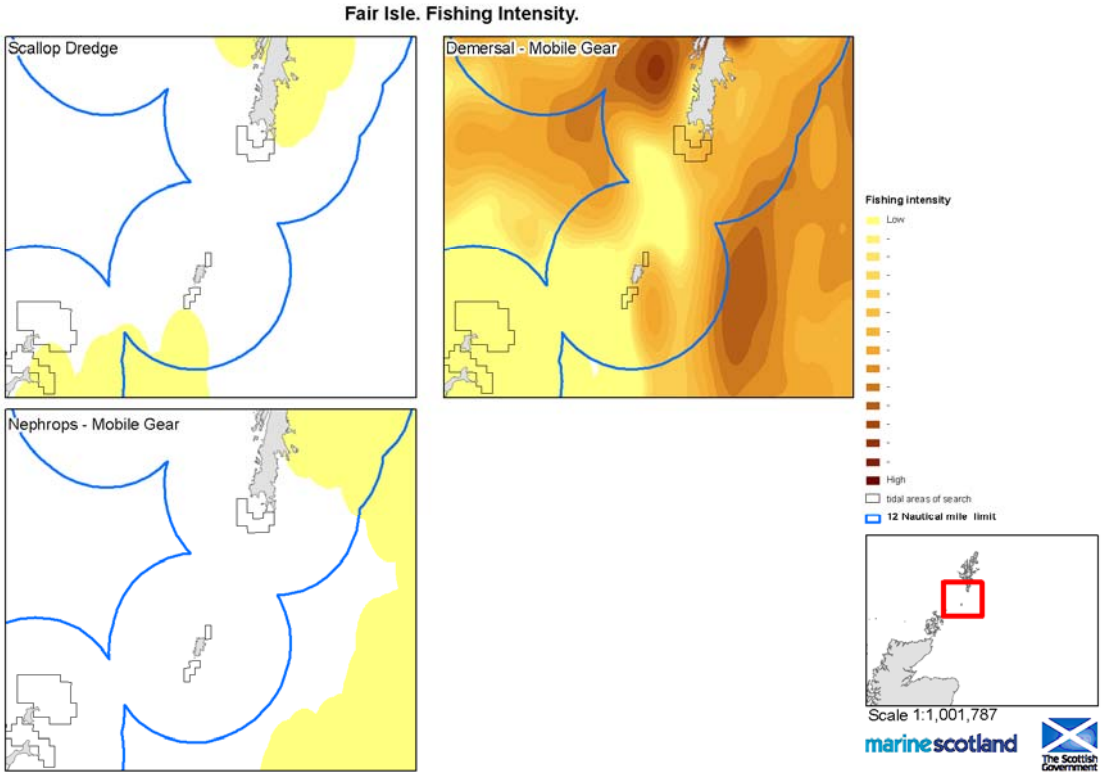


Fig.3.47 Fishing Intensity in the Sumburgh & Fair Isle (Areas of Search) (Pelagic, Demersal – Static Gear, Nephrops - Creels)

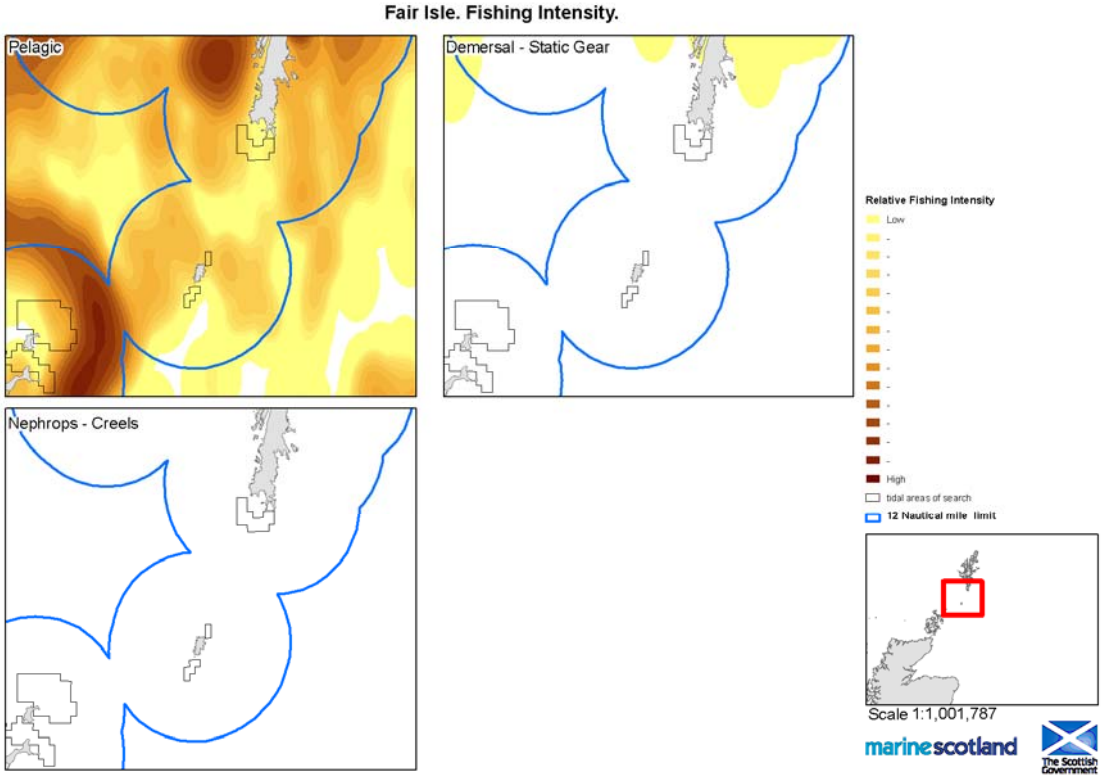


Fig.3.48 Fishing Intensity in the Sumburgh & Fair Isle (Areas of Search) (Brown Crab – Creels, Lobster – Creels, Squid)

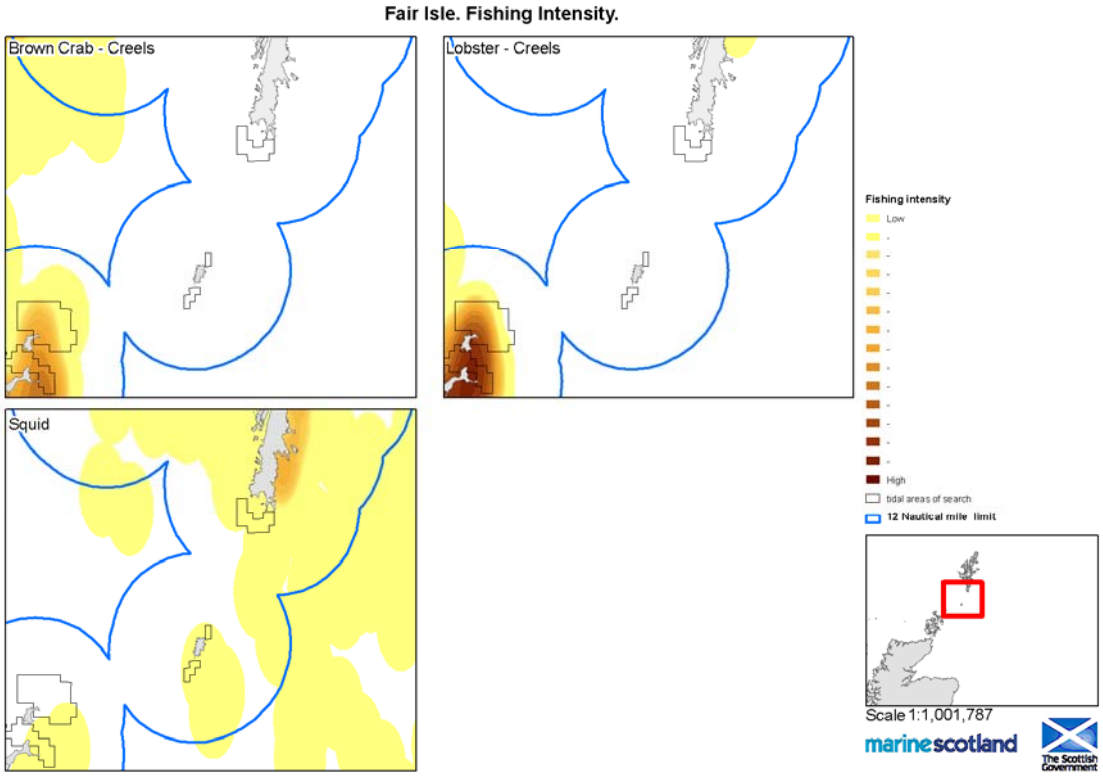


Fig.3.49 Inshore Fisheries in the Sumburgh & Fair Isle (Areas of Search) (Mobile Gears)

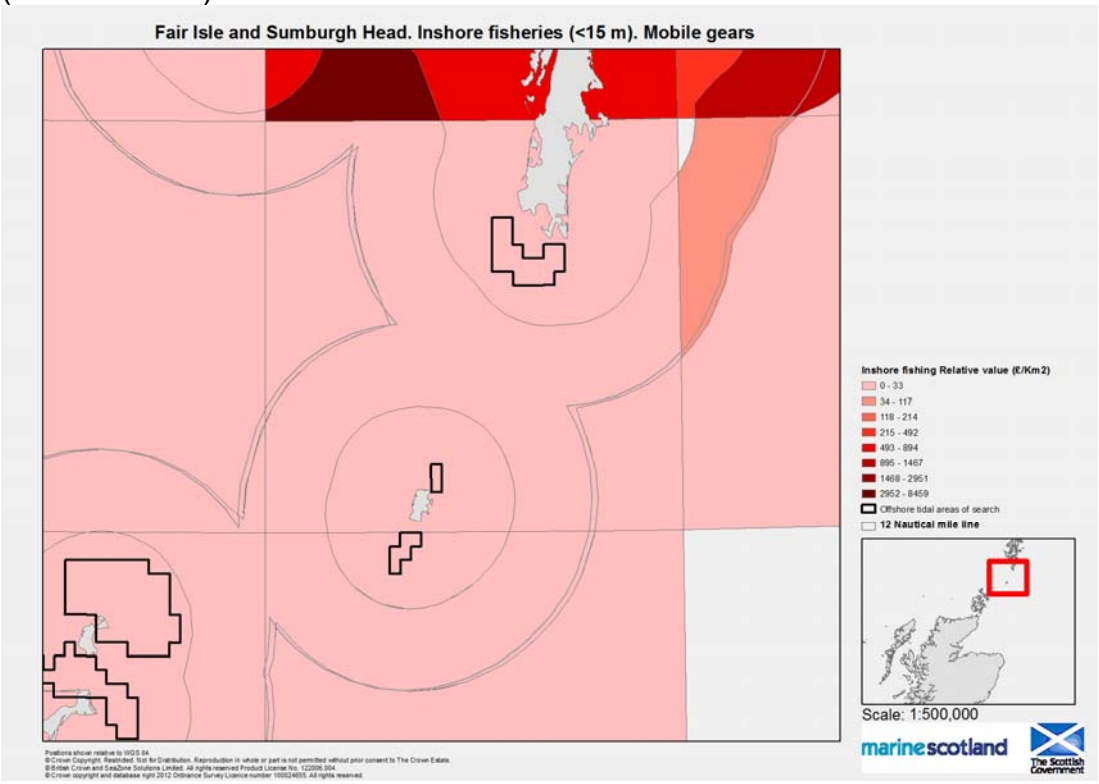
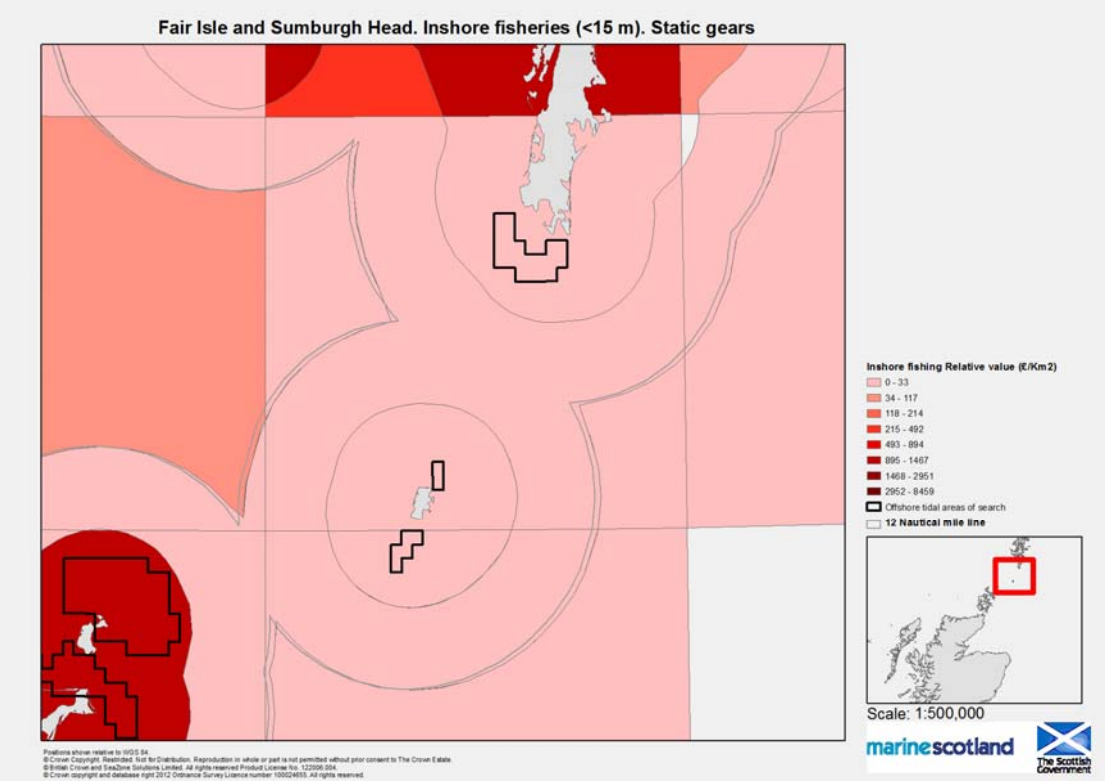


Fig.3.50 Inshore Fisheries in the Sumburgh & Fair Isle (Areas of Search) (Static Gears)



Scotmap Pilot Project

3.8.13 The activity of fishing vessels 15 m and over has been well documented through the use of Vessel Monitoring System (VMS) data, however there has always been less detailed information available for the smaller inshore fleet. As a result, a project is being undertaken to describe spatially this inshore activity and produce a series of maps representing the relative value, weight landed and general usage.

3.8.14 The SCOTMAP pilot study project was developed in order to generate more accurate and reliable representations of inshore fishery activity and value.

3.8.15 In view of their importance to renewable energy, waters around Orkney and the Pentland Firth were chosen for the SCOTMAP pilot study, which was completed in June 2012. The project trialled an interview based fishing activity mapping tool. It was undertaken jointly by SG Marine Renewables policy team and the Marine Scotland Science (MSS) Inshore Fisheries Group.

3.8.16 The data were derived from information submitted during interviews with fishermen (187 in total). This took the form of a questionnaire and a GIS plotting session. The data were then collated and analysed by MSS and the SG Rural and Environmental Science Analytical Services (RESAS). The draft report can be found at:

http://www.scotland.gov.uk/Topics/marine/marineenergy/wave/rlg/pentlandorkney/draftreportonScotMapPentlandFirthandandOrkneyWater.

3.8.17 The SCOTMAP output Figures 3.51 and 3.52, summarise the relative monetary value of fishing areas around Orkney and the Pentland Firth for all the under 15m vessels interviewed. Most of these vessels were creel vessels, although there were small numbers of demersal vessels, scallop dredgers and scallop divers

Fig.3.51 Scotmap Pilot Study Output Map 1

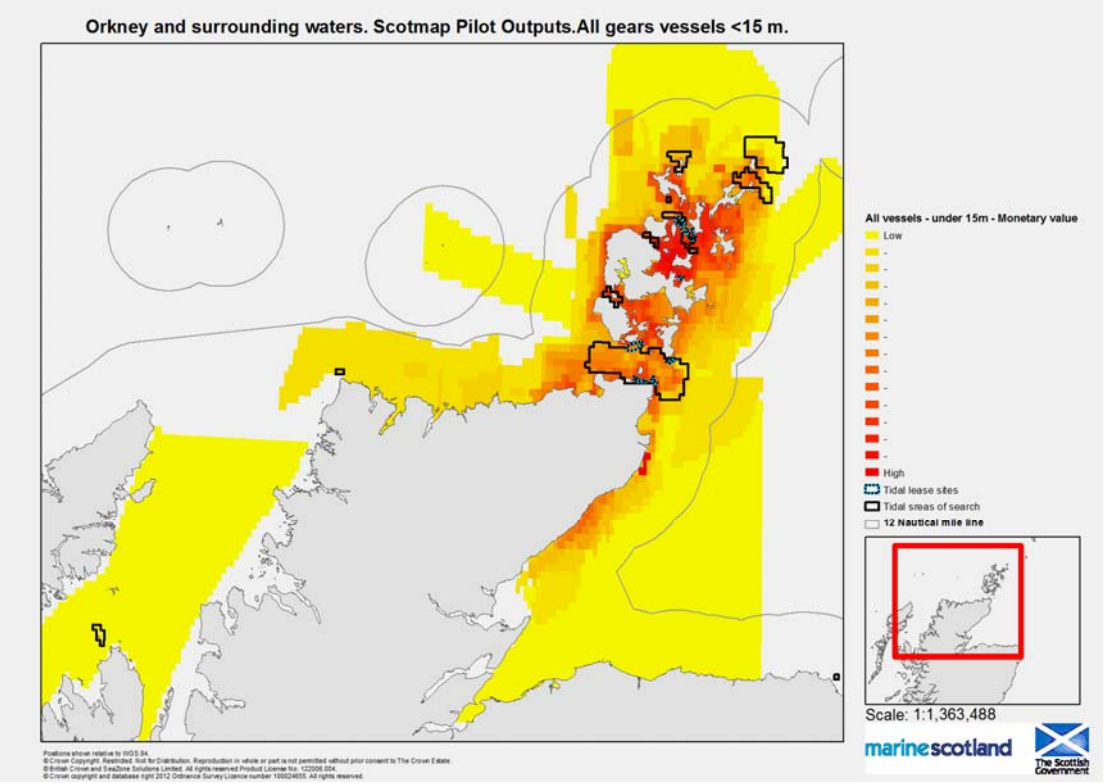
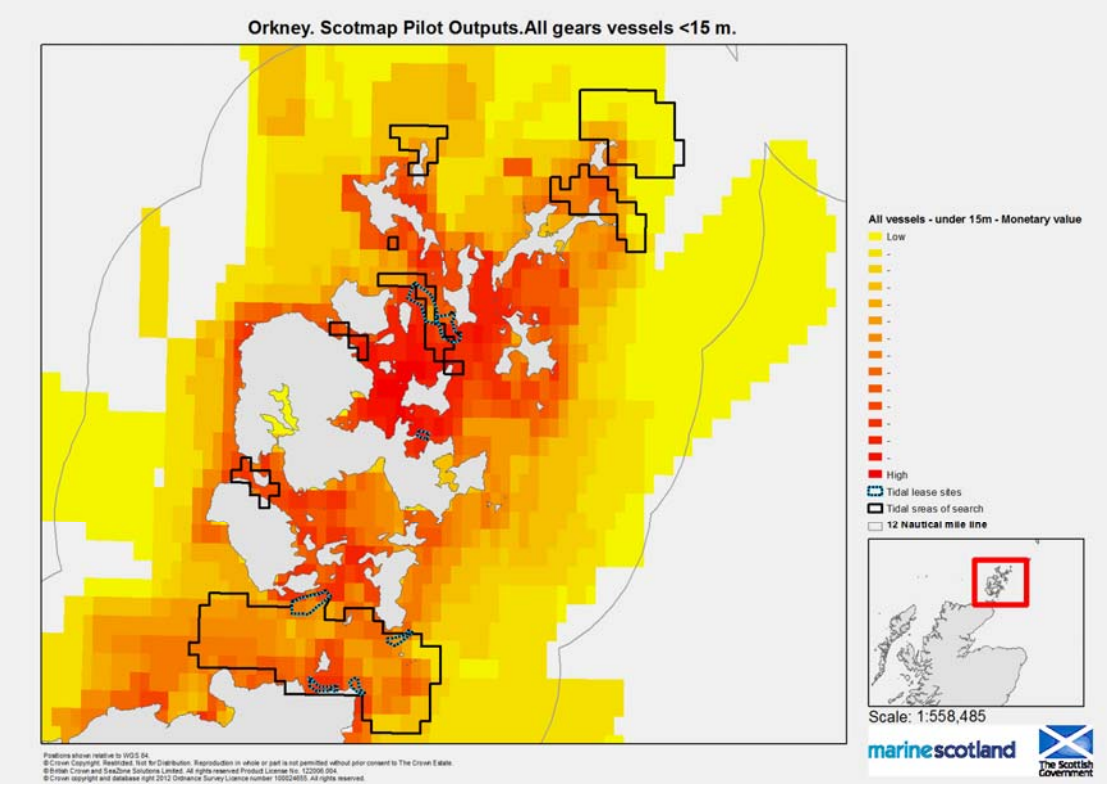


Fig.3.52 Scotmap Pilot Study Output Map 2



Fish Processing Activities

3.8.19 Shetland has the largest pelagic processing factory of its kind in Europe, Shetland Catch, which is based in Lerwick. Shetland also has a whitefish and wild shellfish processing factory in Scalloway among several other smaller processing units serving the local economy. The majority of Shetland whitefish is traded on to mainland businesses.

3.8.20 Orkney has one of Europe's largest and most sophisticated crab processing factories, based in Stromness. It is operated by a cooperative, the Orkney Fishermen's Society, with over 75% of local crab fishermen belonging to it and employs 70 people onshore. The new factory, which was built in the mid 1990s, initially handled 200 tonnes of crab a year, but it has been extended many times since then and capacity has increased ten-fold (Reid, 2010).

3.8.21 For the North SORER, the largest concentration of employment in this sector is in Shetland. Rationalisation and downsizing of the processing industry has taken place in Shetland. Today only one major firm survives, together with several smaller businesses supplying the local market.

3.8.22 In 2010, it was estimated that there were 482 full-time and 140 part-time staff involved in the processing and preserving of fish, crustaceans and molluscs in the North Region.

Wild Salmon and Sea Trout

3.8.23 There is one fixed engine, located on the North coast near Thurso, and no net and coble netting sites in the North SORER.

3.8.24 The main rod and line fishing rivers in this region are the Thurso (salmon) Halladale (salmon), Naver (salmon and sea trout), Borgie (salmon), Dionard (salmon and sea trout), Laxford (salmon). Stocks of sea rout have declined dramatically in the Laxford in the last twenty years (Gray J., 2009).

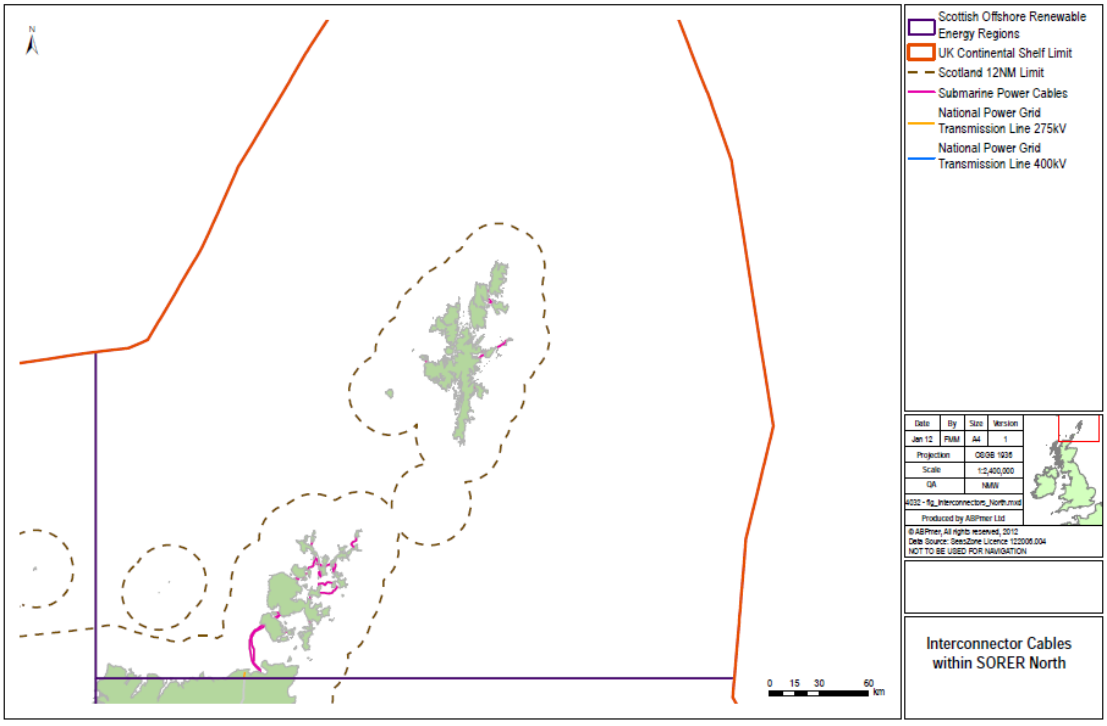
3.9 Infrastructure & Grid Provision

Existing

3.9.1 The North does not host any major power stations.

3.9.2 Numerous domestic subsea power cables exist in this region, connecting the North coast of Scotland and Orkney and islands within the Shetland Islands

Fig.3.53 Interconnector cables in the North Region



3.9.3 The existing infrastructure for electricity grid substations along with an indication of sub-station voltage capacity in relation to the Pentland Firth, Orkney & Westray & Sumburgh & Fair Isle Areas of Search are outlined in Figs.3.54 - 3.56 (below):

Fig.3.54 Existing Infrastructure in the Pentland Firth (Area of Search)

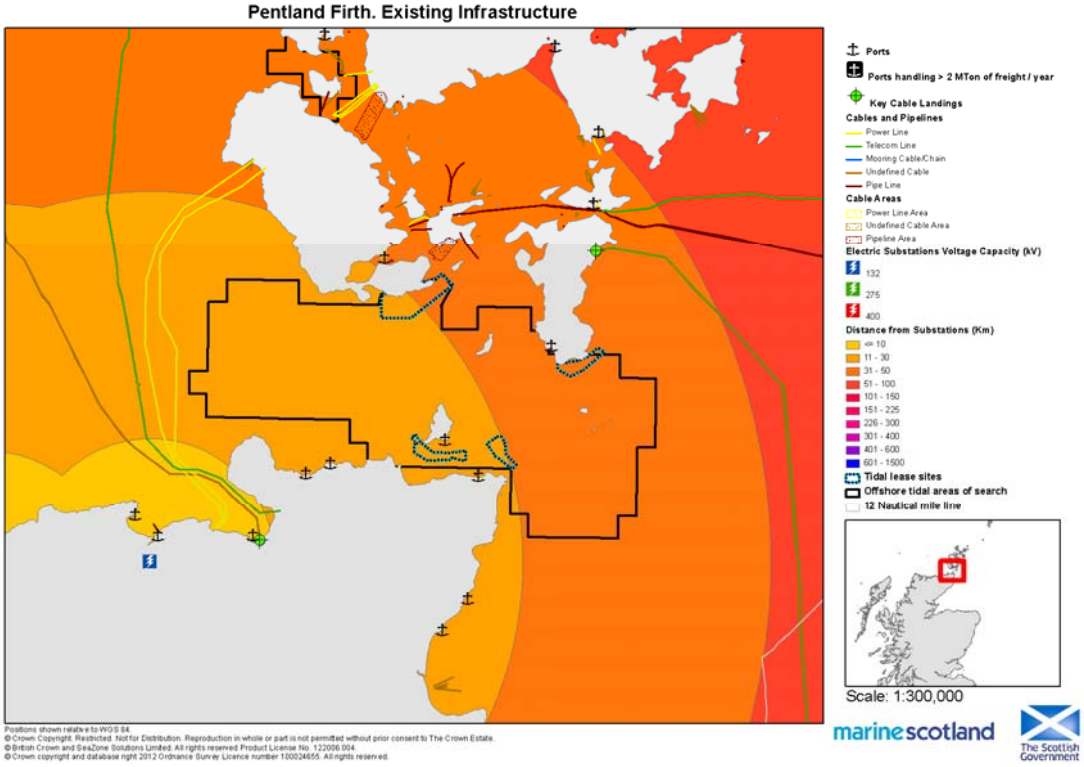


Fig.3.55 Existing Infrastructure in the Orkney & Westray (Area of Search)

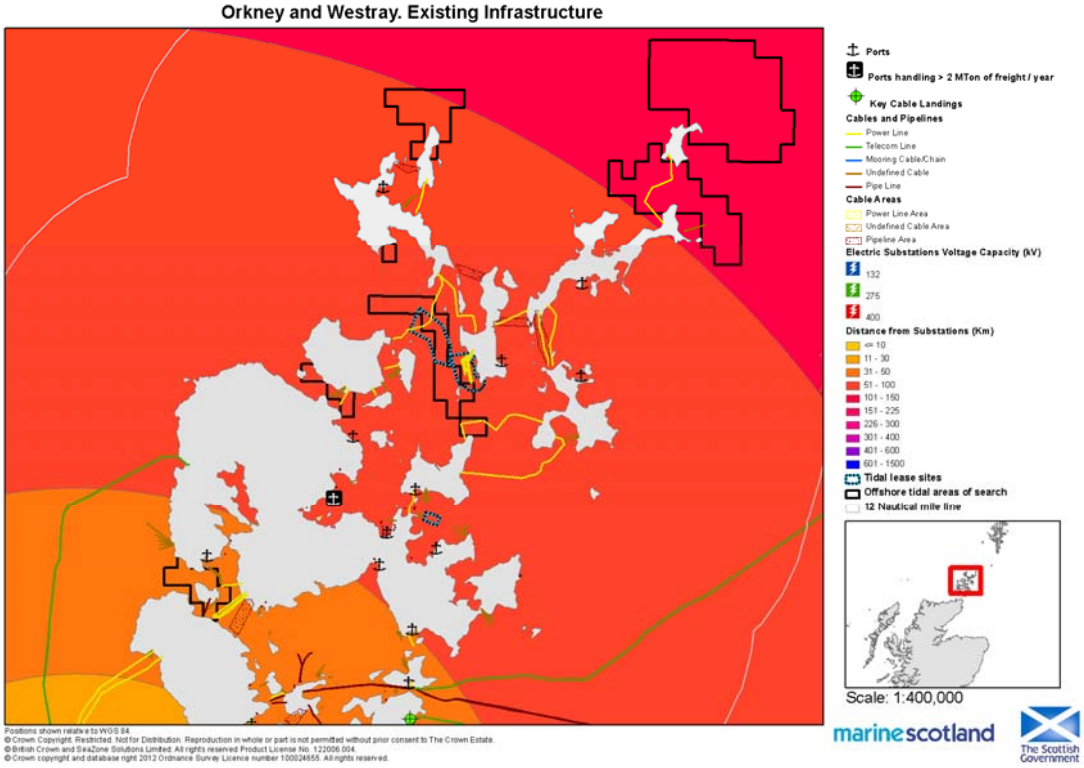
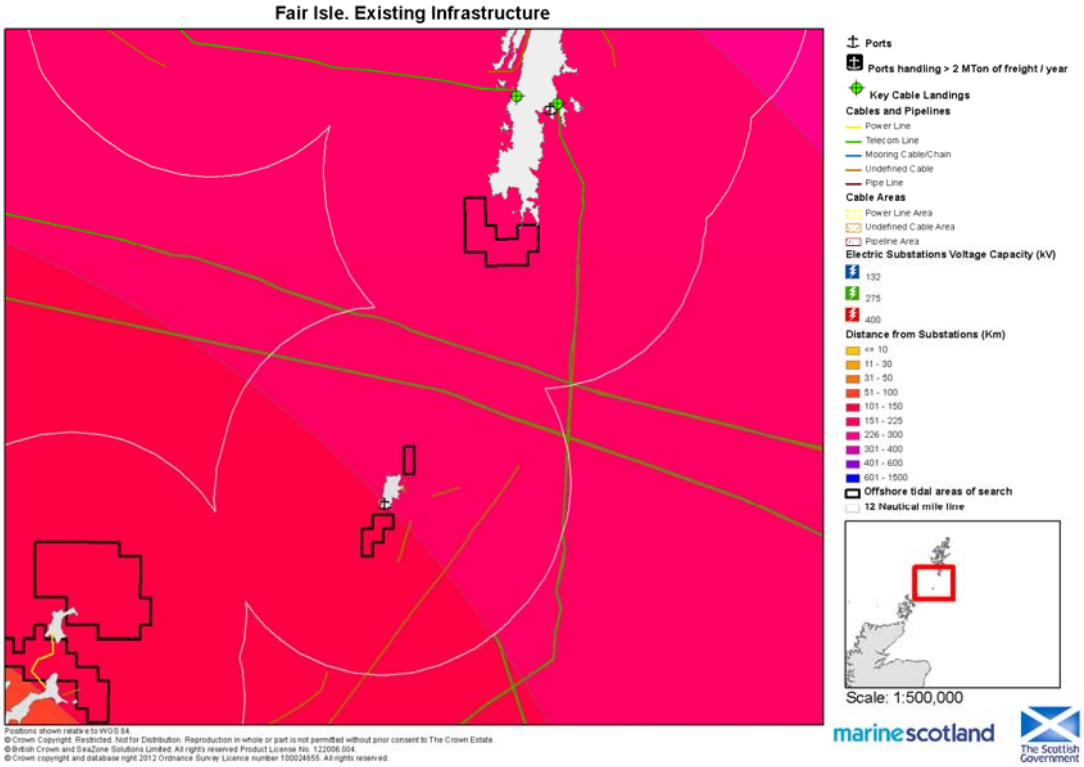


Fig.3.56 Existing Infrastructure in the Sumburgh & Fair Isle (Area of Search)



Future

3.9.4 The potential infrastructure and grid provision with in the North Region is:

- Developments in Pentland Firth connect into Dounreay
- Developments at Orkney connect to Dounreay via the reinforced Orkney sub-sea cable
- Developments around Shetland connect via the Caithness / Moray / Shetland link

3.9.5 Table 3.1 (below) provides an indication of the current stage of the planning for the potential infrastructure projects:

Table.3.1 Planning Stage for Potential Infrastructure Projects

Orkney – Caithness connection	Reinforcement was included in principle within NPF2 and its SEA Included in ENSG but not subjected to SEA HVDC link generally included in EGPS (referring to ENSG) but not specifically assessed. SHETL consultation published October 2011: http://www.sse.com/uploadedFiles/Z_Microsites/_Template_-_transmission(1)/Controls/Lists/Resources/Orkney%20Caithness%20Connection%20-%20Consultation%20Document%20v1.1%20-%20FINAL.pdf • Would require:

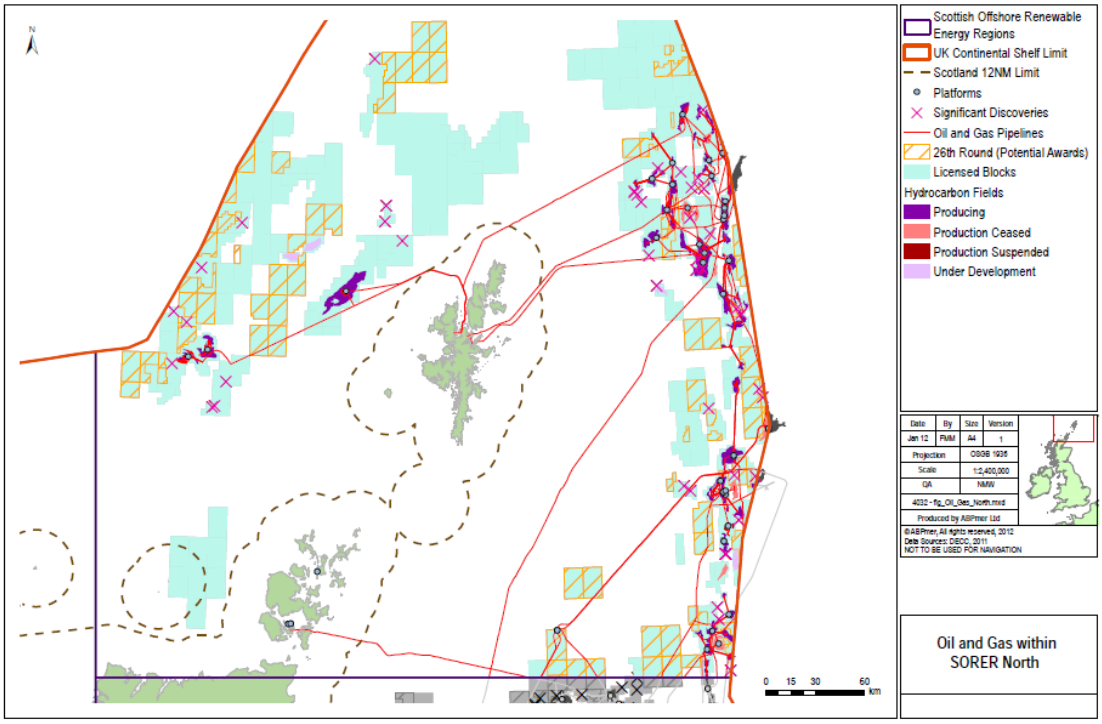
	• a new indoor 132/33kV substation located on the Orkney Mainland, • a section of buried 132kV cable from the substation location to the landfall • point, • a subsea 132kV cable from the landfall in Orkney to the landfall in • Caithness, • a buried 132kV cable from the Caithness landfall to the existing substation at Dounreay. Exploring options with environmental studies (voluntary Environmental Appraisal) to reach view on preferred option. This identifies the likely environmental effects of the options.
New Caithness / Moray / Shetland Link	Not covered in NPF2 and SEA. Included in ENSG but not subjected to SEA. Not covered in EGPS, although HVDC covered generally (referring to ENSG) Requires: • new 600MW converter station and associated substation at a site adjacent to Achanarras, near Spittal in Caithness. • a High Voltage Direct Current (HVDC) buried cable connection to the coast from the proposed converter station; • sub-sea cabling between the landfall at the coast north of Wick to a proposed offshore hub; • the Moray Firth HVDC Hub – which would be a switching station in the North Sea located out with 12 nautical miles from the Scottish coast where water depth is approximately – 50m; connection to an HVDC cable planned to be installed between the hub and an existing substation near Keith in Moray • a 600MW converter station with associated substation located between Mybster and Thurso Cable permissions have been secured for a 600MW link between Upper Kergord on Shetland and Blackhillock in Moray, and outline planning permission has been secured for convertor stations at Upper Kergord and Blackhillock.. Slippage of Viking wind farm on Shetland means that a planned Caithness/Moray subsea circuit to allow for the export of renewable generation from Caithness, Pentland Firth and Orkney now comes before Shetland link. The offshore hub is therefore proposed as part of Caithness-Moray circuit, allowing for connection of future Shetland link as well as potential offshore wind farm developments in the Moray Firth. An updated funding request to Ofgem is being prepared.

3.10 Oil & Gas

3.10.1 In this region, Oil and Gas activity is concentrated in offshore waters to the East and West of the Shetlands and to the East of the Orkney Islands (i.e. along the Eastern and Western borders of the SORER). Oil and Gas pipelines connect these areas of high activity with the Shetlands, Orkney and Aberdeen (in the North East SORER).

3.10.2 There are 65 producing hydrocarbon fields in this region (51 producing oil; 4 gas and 10 condensate) (DECC website[51]), see Figure 3.57.

Fig.3.57 Oil and Gas activities in the North Region



3.10.3 Information on the annual production of crude oil from hydrocarbon fields in the UKCS are provided by DECC[52]. Indicative estimates of the total production of crude oil from hydrocarbon fields within this region was 18 million tonnes in 2008 and 2009 and 17 million tonnes in 2010. Gas production statistics are not allocated to hydrocarbon fields and hence it was not possible to estimate gas production from fields within this region.

3.10.4 Figs 3.58-3.60 below contain the known activities in relation to oil and gas in relation to the areas of search in Pentland Firth, Orkney & Westray and Sumburgh & Fair Isle.

Fig.3.58 Oil and Gas activities in the Pentland Firth (Area of Search)

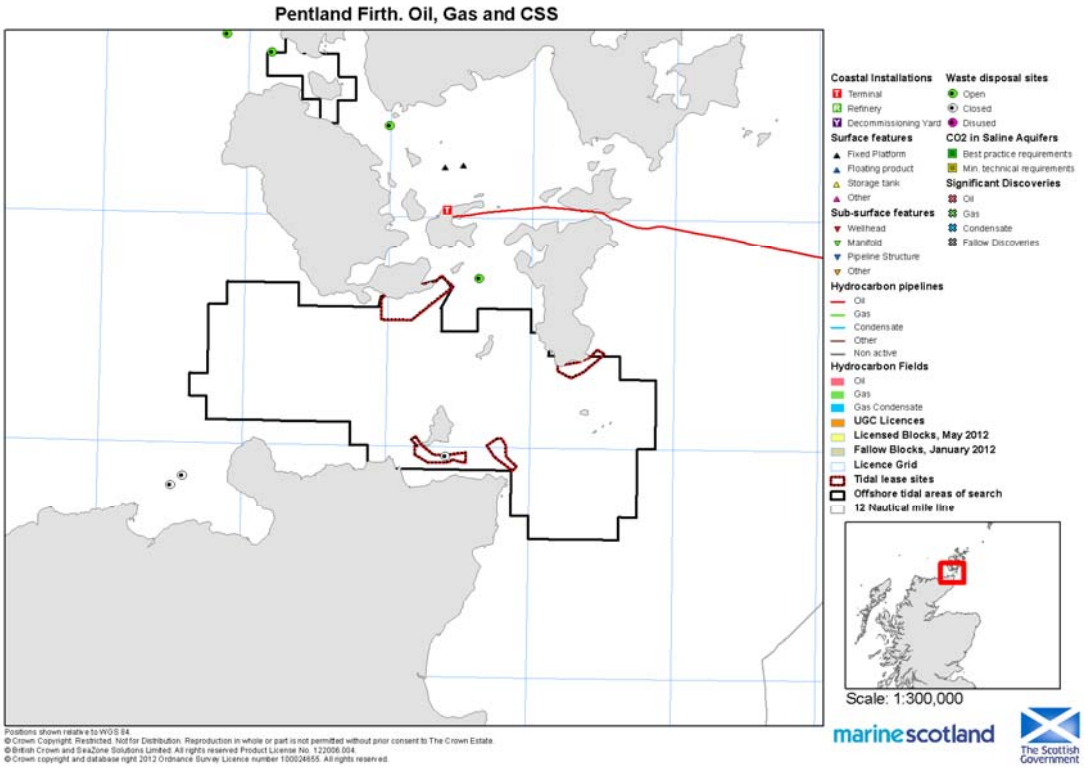


Fig.3.59 Oil and Gas activities in the Orkney & Westray (Areas of Search)

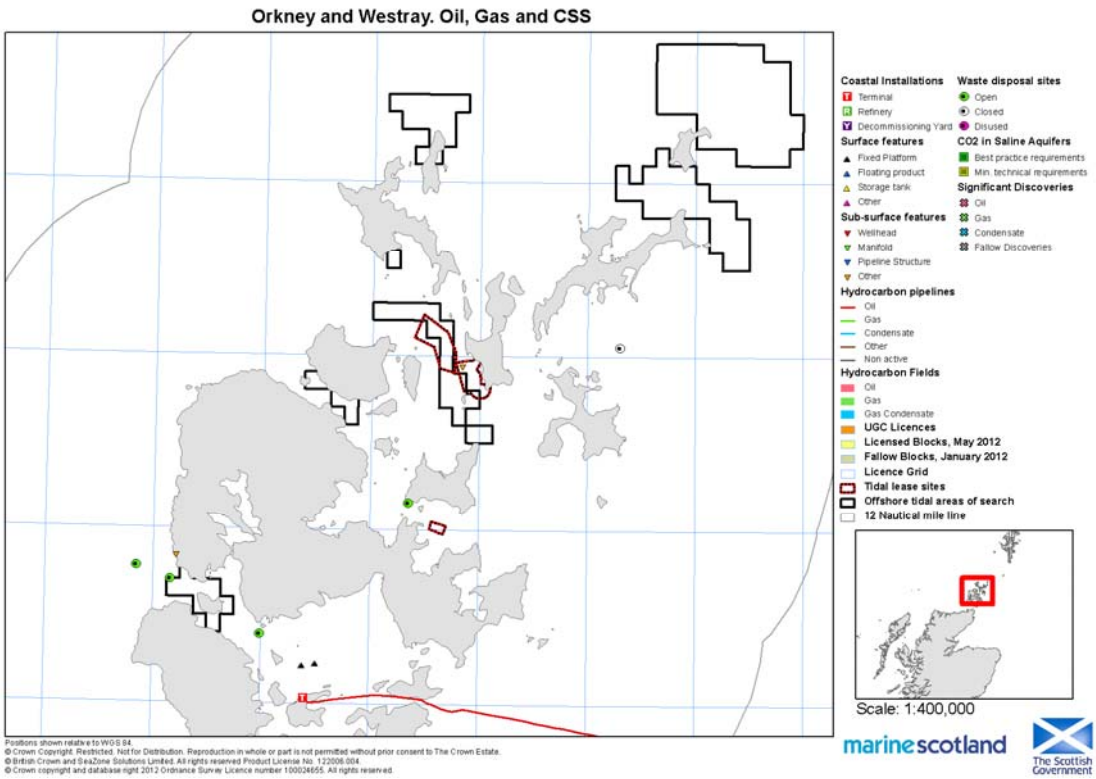
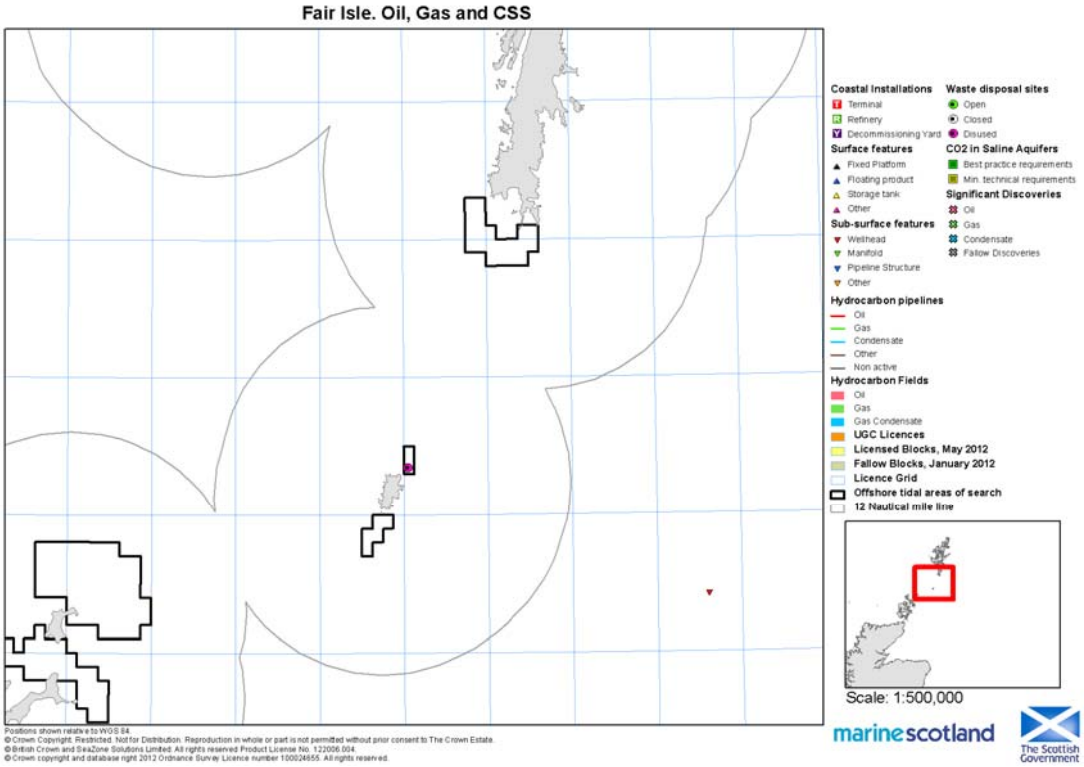


Fig.3.60 Oil and Gas activities in the Sumburgh & Fair Isle (Areas of Search)



3.11 Planning Issues

Shetland Islands Marine Spatial Plan

3.11.1 The Shetland Islands Marine Spatial Plan provides the key planning framework of relevance to marine renewable energy proposals within the Shetland area of the North West region. A Draft Plan was published for consultation, and the responses are currently being reviewed, with a view to finalising the Plan in 2012. The Plan aims to promote sustainable use of the marine environment and covers only territorial waters. It sets out a hierarchy of policies to achieve this, ranging from broad principles to more sector specific objectives. Key considerations set out in the plan include climate change, with the plan noting the importance of renewable energy and highlighting the need to improve grid connections to realise its development aspirations.

3.11.2 The plan includes a series of heritage based policies which also aim to achieve the right balance between protecting assets and fulfilling development aspirations. Its general policies emphasise the need for activities within the marine environment to take into account impacts on other sectors, with Policy GEN2, stating that this includes heritage, community, business and industry, infrastructure and services. Policy GEN1 sets out the impacts that should be considered when proposing new developments and activities: including whether existing facilities are inadequate, post-development restoration, land based impacts, impacts on

climate changer, water resources, wider ecosystem function, coastal erosion and sediment transport.

3.11.3 More specifically, key policies relating to renewable energy are as follows:

- Policy MSP NRG1: Exploratory, Appraisal or Prototype Renewable Energy Proposals. This supports experimental activities, subject to compliance with protective policies, appropriate monitoring and restoration arrangements; and
- Policy MSP NRG2: Renewable Energy Development Proposals. This encourages development where they comply with the plan's protective policies, all elements including onshore connections are considered, appropriate monitoring, restoration and maintenance. Early engagement with SNH, communities, and local industry (particularly fishing) is recommended.

3.11.4 The Plan also safeguards the sustainability of the fishing industry and stocks, and restricts development where it could obstruct an important fishing ground (as identified by the industry), routes between a port or harbour of spawning and nursery areas. Areas of interest are mapped in detail in the accompanying marine atlas.

Shetland Islands Local Development Plan

3.11.5 Shetland Islands Council produced a MIR for its LDP was published in March 2010. Work is now progressing on the Proposed Plan.

Orkney

3.11.6 The Proposed Orkney LDP was published in 2011. It recognises the importance of renewable energy development in tackling climate change and achieving economic growth. It includes policies that aim to protect the sensitive landscapes within its coastal zone, whilst avoiding frustrating development that requires a coastal location. As a result, Strategic Development areas are identified at Lyness, Billia Croo, Stromness and Houton, to facilitate investment in the marine and renewables sectors. Constrained areas are also identified, to help steer renewable energy developments towards areas where there is greater capacity. Broad Areas of Search are set out in Supplementary Guidance, which take into account a range of constraints. The proposed LDP also states that Supplementary guidance will be produced to address onshore infrastructure requirements arising from marine renewable energy developments, and the need for improved grid connections.

3.11.7 Policy SD7 of the proposed LDP provides a decision making framework for renewable energy developments. This aims to achieve development, where significant adverse environmental effects can be avoided or appropriately mitigated.

3.12 Ports and Harbours

3.12.1 On Orkney, Hatston (Kirkwall) and Lyness on Orkney are included within the Low Carbon / Renewables North Enterprise Area. They have also been identified as key sites to support the wave and tidal sectors, for further consideration in N-RIP Phase 2. NorthLink Ferries uses both Kirkwall to connect to the more northern Shetland Isles and Stromness and as a port for the mainland ferry. The opening of deep water facilities at the adjacent **Hatston** extended the scope for Kirkwall to service a range of larger craft including cruise ships. This is a key centre for both fishing and leisure activities. Hatston is already linked into the renewables sector, and used by developers involved in the European Marine Energy Centre (EMEC). Further development of the port is already underway.

3.12.2 **Lyness** is the port for the ferry from the Mainland to Hoy. It is a key economic investment area, identified to support assembly, storage and servicing of renewable energy devices. A development brief has been prepared to guide the planning and investment planned around Lyness Harbour and the wider peninsula. Improvements will be made to the moorings, new buildings are planned and extensive areas of hard standing will be laid.

3.12.3 On Shetland, **Sullom Voe** is a major deep water harbour servicing the oil sector. It provides extensive facilities and can accommodate large scale vessels and freight.

3.12.4 **Lerwick** harbour supports fishing and leisure activities. **Scalloway Harbour** lies on the west coast of Shetland, accommodating freight and commercial fishing activities.

3.12.5 On the mainland **Scrabster** is a key port, identified for further consideration in Phase 2 of the N-RIP. Its location on the Pentland Firth is focusing plans for improvement and investment, to support the wave and tidal renewables sectors. Redevelopment is ongoing. **Wick** has also been identified as a key potential location to support wave and tidal related activities in Phase 2 of N-RIP.

3.12.6 In addition to the three large ports in this region, a further 42 ports and harbours are located in four distinct areas: mainland Scotland, the Orkney Island, Fair Isle and the Shetland Islands. Many of these ports provide important facilities, quays, jetties and shelter for offshore vessels moving between port locations and the offshore oil, gas and renewable industry in Scottish waters.

Figure 3.61 Ports and Harbours in the North Region

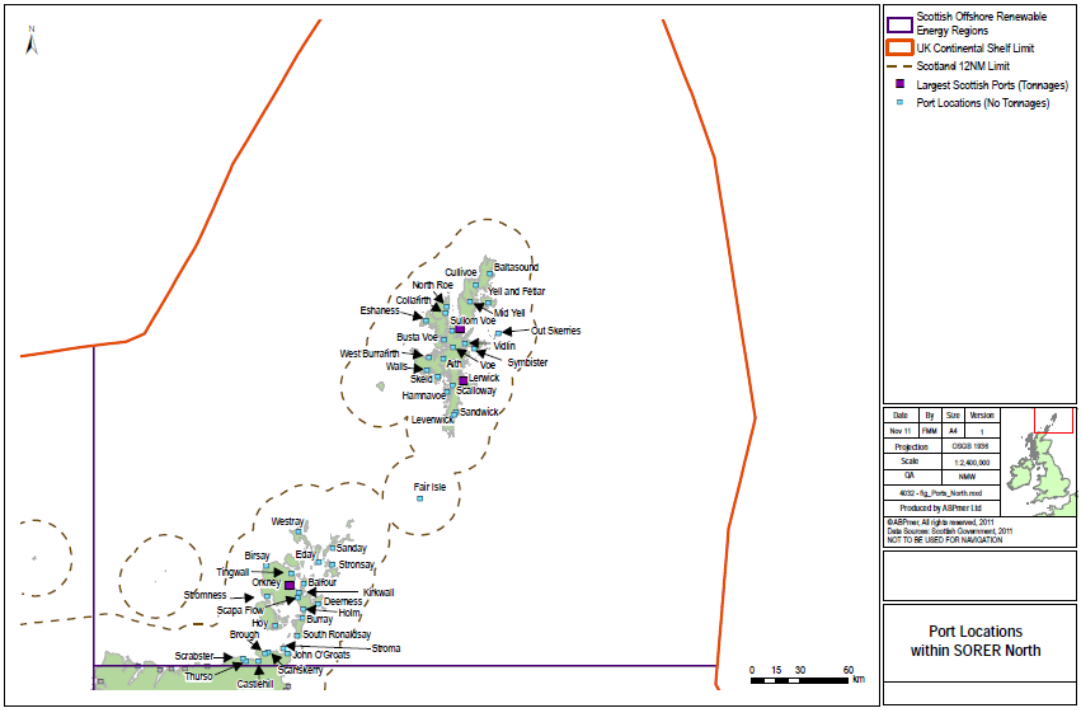


Table.3.2 Ports and Harbours in the North Region

Port	Operator	Type
Aith		Local Authority
Balfour		Local Authority
Baltasound		Local Authority

Birsay	Barony Hotel - Birsay	Private
Brough		Private
Burray		Local Authority
Busta Voe		Local authority
Castlehill		Private
Collafirth		Local Authority
Cullivoe		Local Authority
Deerness	Deerness Small Boat Owners Association	Private
Eday		Local Authority
Eshaness		unknown
Fair Isle		Local Authority
Hamnavoe		Local Authority
Holm		Local Authority
Hoy		Local Authority
John O'Groats		Local Authority
Kirkwall	Orkney Islands	Local Authority
Lerwick	Lerwick Port Authority	Trust
Levenwick		unknown
Mid Yell		Local Authority
North Roe	Shetland Islands Council	Local Authority
Out Skerries	Shetland Islands Council	Local Authority
Sanday	Orkney Islands Council	Local Authority
Sandwick	Also known as Broonies Taing Pier	Brownies Taing Pier Trust
Scalloway	Shetland Islands Council	Local Authority
Scapa Flow	Orkney Islands	Local Authority
Scarfskerry		Local Authority
Scrabster	Scrabster Harbour Trust	Trust
Skeld		Local Authority
South Ronaldsay		Local Authority
Stroma		Local Authority
Stromness	Orkney Islands	Local Authority
Stronsay		Local Authority
Sullom Voe	Sullom Voe Harbour Authority	Local Authority
Symbister		Local Authority
Thurso		Local Authority
Tingwall		Local Authority
Vidlin		Local Authority
Voe		Local Authority
Walls		Local Authority
West Burrafirth		Local Authority
Westray		Local Authority
Yell and Fetlar		Local Authority

(Source: Marine Scotland, 2011a)

3.12.7 Ports within this region contribute to the local and the regional economy as employers, and through the provision of essential services and facilities as lifeline services for ferries, and berths for fishing vessels other than the cargo tonnages detailed for Orkney, Sullom Voe and Lerwick. Other ports providing input to the local economy include Scrabster Harbour which has an annual reported economic output of £39m, supporting 339 full time jobs and contributing a GVA impact of £14.6 million to Caithness. Scrabster Harbour handles a gross tonnage in 2007 of 9.85Mt. The port also has a significant trade in shellfish and demersal fish (see Section 6.6). The port also accommodates lifeline ferry service links to the Orkney Isles with 149,000 passenger and 46,000 vehicles. The port hosts international ferry services and cruise liner calls with some 6,294 passengers and 2,000 vehicles

handled in 2007, returning an estimated £4m for the Highland economy (Scrabster Harbour Trust, 2008).

3.12.8 Employment in this region is dominated by employees in the service industry supporting water transportation. In 2010, it was estimated that there were 284 full-time and 131 part-time staff working in port and harbours in the North Region.

3.13 Recreation

Recreational Angling

3.13.1 The main launch spots for charter based angling are Thurso in North Scotland and Stromness on Orkney (Radford et al., 2009). Wreck angling is popular in Scapa Flow and also on other wrecks found offshore from Orkney. Cod, pollack and mackerel, are the most popular target species in Caithness and Sutherland. There is some evidence, however, of sports fishing for rarer species such as porbeagle shark becoming more popular. In Orkney conger eel is found amongst the wrecks of Scapa Flow and is the most popular target species, followed by mackerel and bass (Radford et al., 2009).

3.13.2 A study by Radford et al. (2009) estimated the sea angling activity and economic value in eight regions of Scotland. Two of these regions, North Scotland and Orkney and Shetland fall within the North Region. As the areas in Radford et al. (2009) do not align with the North Region the values should only be taken as indicative values for comparison between areas. The total estimated regional sea angling activity and expenditure within these two regions is £11.2m in the North and £6.1m in Orkney and Shetland. In terms of employment, angling accounts for around 300 employees in the North Region and a further 145 in Orkney and Shetland.

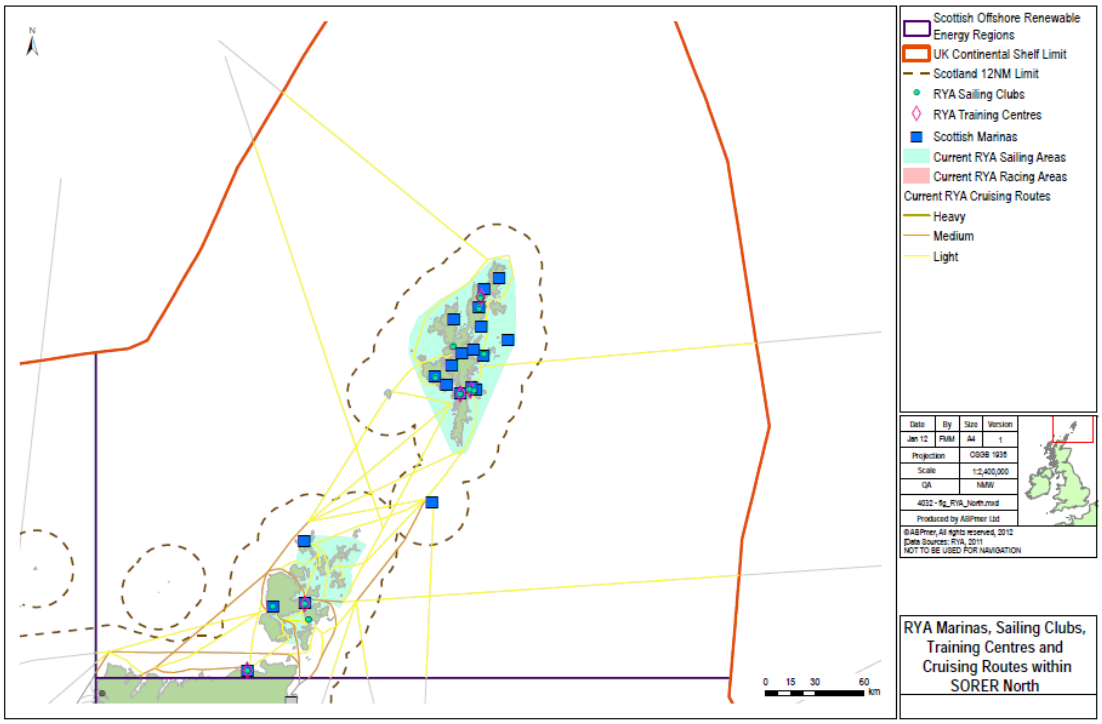
Recreational Boating

3.13.3 Recreational boating along the North coast of Scotland and outlying islands of Orkney and Shetland is seen by many as the 'fringe' of recreational boating, but the number of berths available has increased in recent years, following a growth in demand from Scottish residents for home port facilities and to service a growing volume of visitors, many from overseas. The North is characterised by a significant proportion of demand that derives from visitors from outside Scotland, notably other Northern European countries, this overseas demand is notably present in Orkney and Shetland waters (Scottish Enterprise, 2010).

3.13.4 Informal cruising routes in the study area are shown in Figure 3.62. These include Wick Harbour (marina) and deep water anchorage either directly to the Shetland Isle or Fair Isle, or via Duncansby Head to the Orkney Isles, or along Scotland's Northern coastline. There are few facilities for recreational boaters cruising through Pentland Firth on passage to Cape Wrath and the

Hebrides, other than small anchorages, piers and jetties. The principal port of call along Scotland's Northern coast is Scrabster which provides a number of marine facilities. Recent marina developments have provided stopping points along the East Coast of Scotland, making progression to the Isles of Orkney and Shetland a more attractive proposition. The four main marina operators between Inverness and Shetland have grouped together to create the Viking Trail to encourage greater use of the new facilities and open up cruising routes to the Northern isles.

Figure 3.62 Recreational boating activity in the North Region



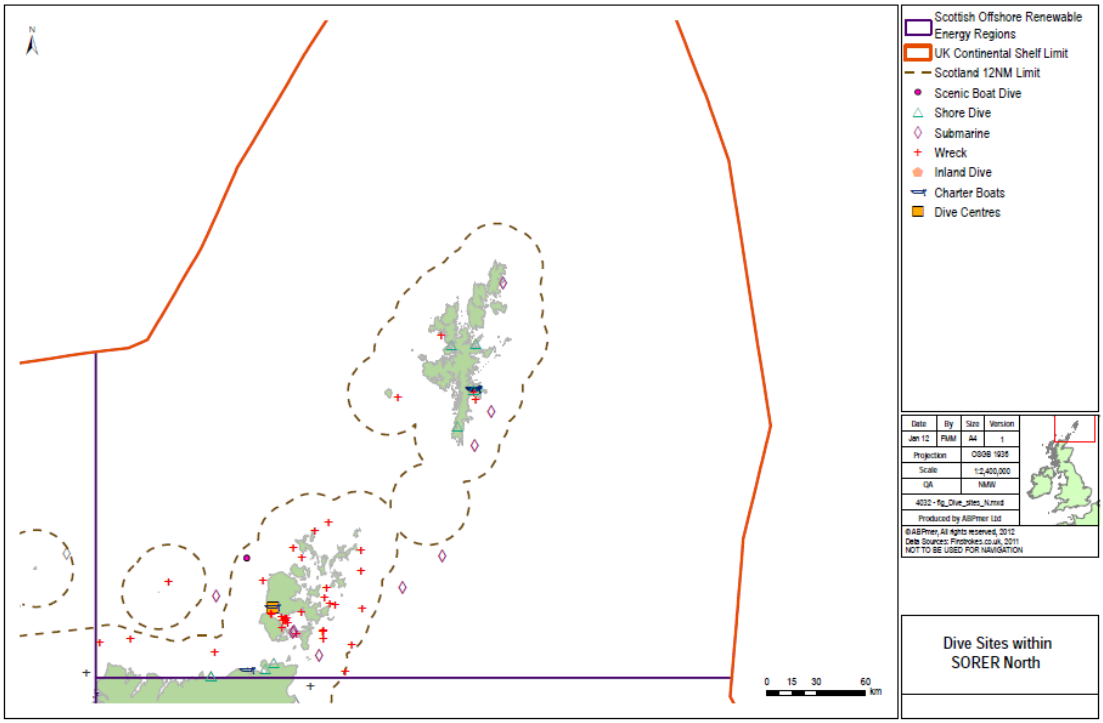
3.13.5 Until recently the Orkney Islands were viewed primarily as a stopping off point for sailors en route from Scandinavia to Scotland. However, after over £6 million of investment by Orkney Islands Council in breakwaters and pontoons, recreational boaters now have the choice of three marinas at Kirkwall (94 berths), Stromness (64 berths) and at a small marina and pontoon facility at Westray. Numerous islands have alongside jetty berthing available and there are also visitor moorings available at locations throughout the islands. The smaller islands are a haven for wildlife, and all have interesting flora and fauna. The net result is that Orkney is now viewed as a destination in its own right by cruising yachtsmen, be they on a circumnavigation of Scotland or Britain, or charterers taking a boat from the charter company based in Kirkwall, (Sail Scotland, 2011) and (Orkney Marinas, 2011).

3.13.6 An indicative estimate of the economic impact of sailing on this region is provided by the Scottish Enterprise (2010). It is estimated that the sailing area has a GVA of £7.9m with 1,792 pontoons and 224 moorings in the Region.

Scuba Diving

3.13.7 The most popular area for scuba diving in the region is around Scapa Flow in Orkney (Figure 3.63). This body of water is considered one of the finest wreck diving sites in Europe and has ranked among the top five wreck diving areas of the world (Jack Jackson, 2007; Baxter et al, 2011). While scuba diving has predominantly been based in Scapa Flow historically, it increasingly involves diving in other parts of Orkney (Jack Jackson, 2007; Visit Orkney, 2009) and also on Shetland. Recreational diving is predominantly charter based with an estimated 3,000 visiting divers annually (The Orkney Hyperbaric Trust). A limited amount of diving is also undertaken on the mainland in this region.

Figure 3.63 Recreational diving activities in the North Region

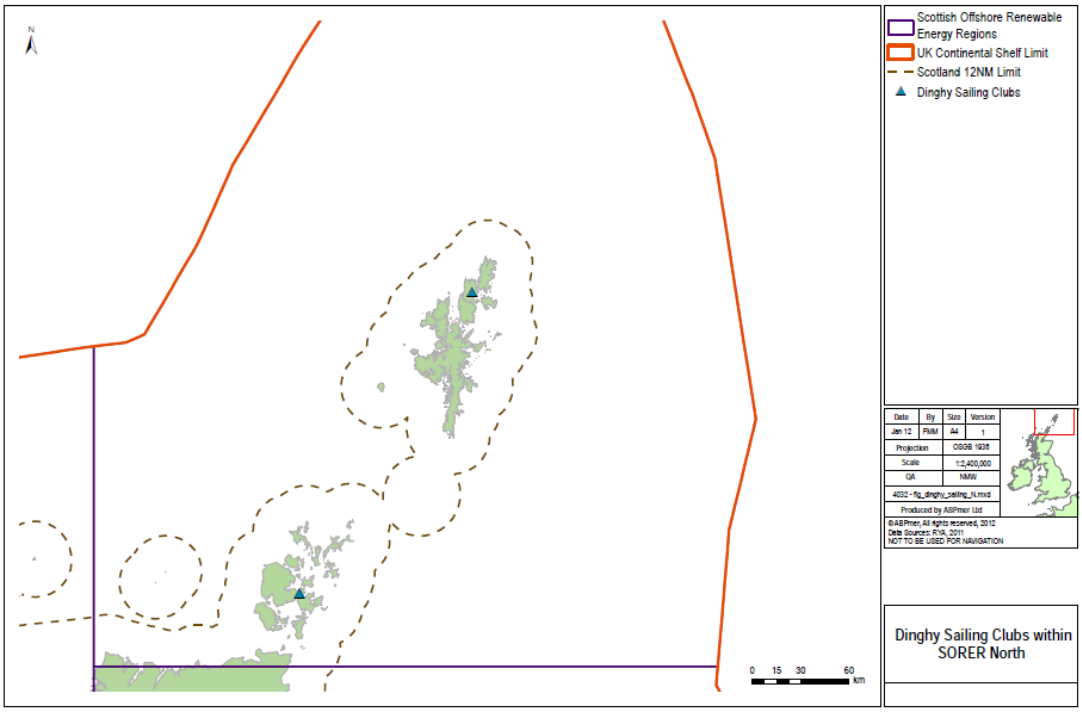


3.13.8 The Orkney Hyperbaric Trust was set up to increase diver safety within Orkney waters. Diving is an important industry in this region and is estimated to be worth at least £3m a year to the Orkney economy (The Orkney Hyperbaric Trust, 2008). The diving industry consists of military and police, commercial and archaeological and recreational, the latter accounting for approximately 25,000 of the dives made each year which are carried out from two dive boats, who take around 3,000 visiting divers/year, to dive sites such as the Scarpa Flow area.

Sea Kayaking and Small Sail Boat Activity

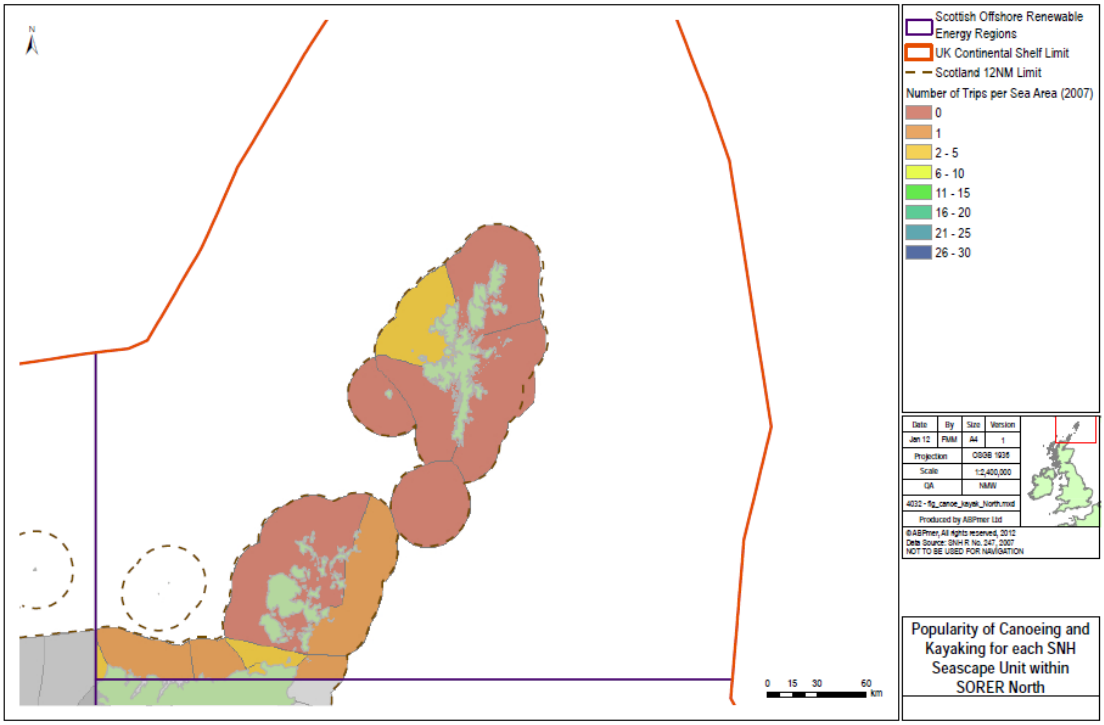
3.13.9 Dinghy sailing clubs are located in Kirkwall, Orkney and in Northern Shetland (Figure 3.64).

Figure 3.64 Dinghy Sailing Clubs in the North Region



3.13.10 In terms of popularity, kayaking around Orkney and the North coast of Scotland is not considered as important as other regions such as the Inner Hebrides and East Grampian Coast (Land Use Consultants, 2007) (Figure 3.65).

Figure 3.65 Kayaking and Small Boat Activities in the North Region



Surfing and Wind Surfing

3.13.11 Some of the UK's best surfing breaks are situated along the North coast of Scotland. The region receives strong, powerful swells and provides a number of high-quality surfing spots. In particular, the reefs situated around Brims Ness and Thurso are considered to be world-class (SAS, 2009). Orkney also has good quality surfing locations although participant numbers are less than on mainland North Scotland, primarily due to accessibility (SAS, 2010). The location of surfing breaks in the North area can be seen in Table 3.2 and Figure 3.66.

Figure 3.66 Surfing and Windsurfing locations in the North Region

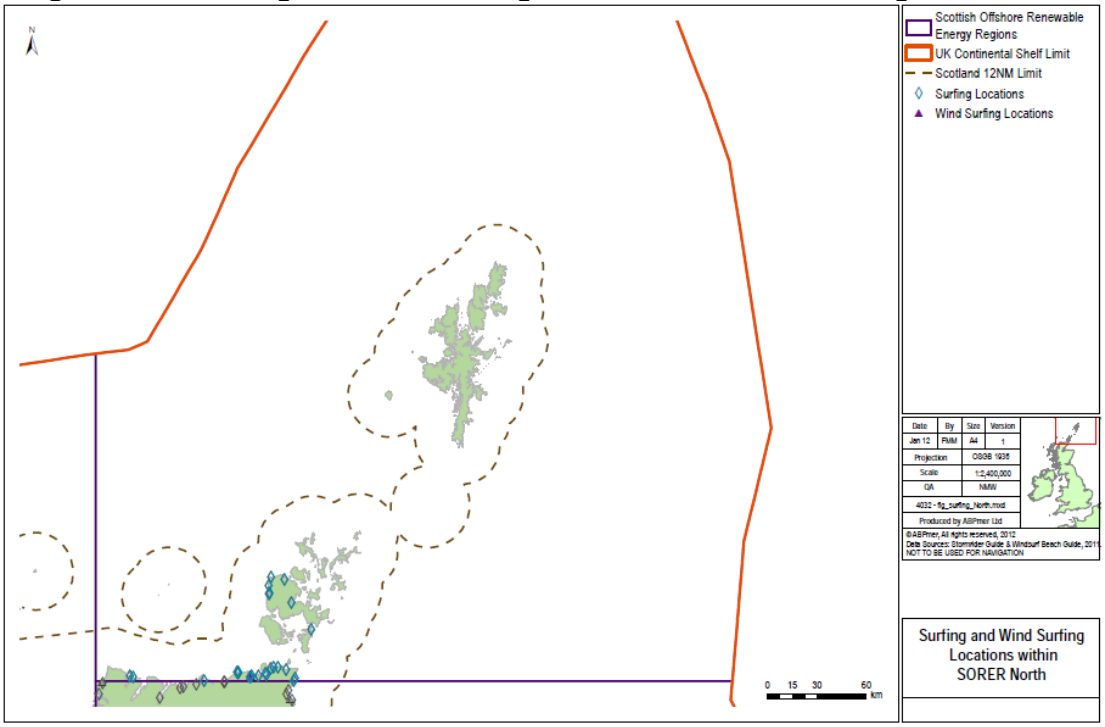


Table.3.3 Key Surfing and Windsurfing Locations in the North Region

General Location	Surf Location
Sutherland	Melvich
	Strathy
	Armadale Bay
	Farr Bay
	Torrisdale
	Kyle of Tongue
	Sandwood Bay
	Point of Ness
	Dunnet Bay
	Castlehill to Murkle
	Murkle Point
	Thurso East*
	Shit Pipe
	Brimms Ness - The Point
	Brimms Ness - The Cove
	Brimms Ness - The Bowl
	Sandside Bay*
Caithness	Gills Bay
	Brunt Skerries
	Harrow Harbour
	Scarfskerry Reefs
	Ham
Orkney	Marwick
	Skail Bay Right
	Skara Brae
* Also listed in the Windsurf magazine 'beach guide' (http://www.windsurf.co.uk/beachguide)	

(Source: Based on SAS, 2009 and 'Stormrider Guides', 2010 (http://www.lowpressure.co.uk); and Windsurf Magazine 'Beach Guide', 2011 (http://www.windsurf.co.uk/beachguide))

3.13.12 Windsurfing on Orkney is a popular activity at Kirkwall's Scapa Beach and Orphir's Waulkmill Bay. In addition, the storm beach of Skaill Bay on the West coast of mainland Orkney and Sandwick, are popular spots (Visit Orkney, 2009).

3.13.13 While no estimates of the total value of surfing in the North Region are available the value of Scotland's largest surfing event, the O'Neill Coldwater Classic at Thurso East has been calculated. The annual competition is an Association of Surfing Professionals (ASP), World Qualifying Series (WQS) event, which is listed as a six star event, the highest rating in the WQS and also the highest rated professional surf contest ever held in the UK (Event Scotland, 2010). The 2010 event achieved estimated spectator numbers of 5,500 over the 8-day event. The event resulted in an estimated expenditure of £440,000 to the local economy and an additional £420,000 within wider Scotland with major influential media coverage totalling £3.8m.

Areas of Search

3.13.14 Figures 3.67 – 3.69 below identifies the recreational activities taking place in the North Region and the areas of search around Orkney and Shetland.

Fig.3.67 Recreational activity in the Pentland Firth (Area of Search)

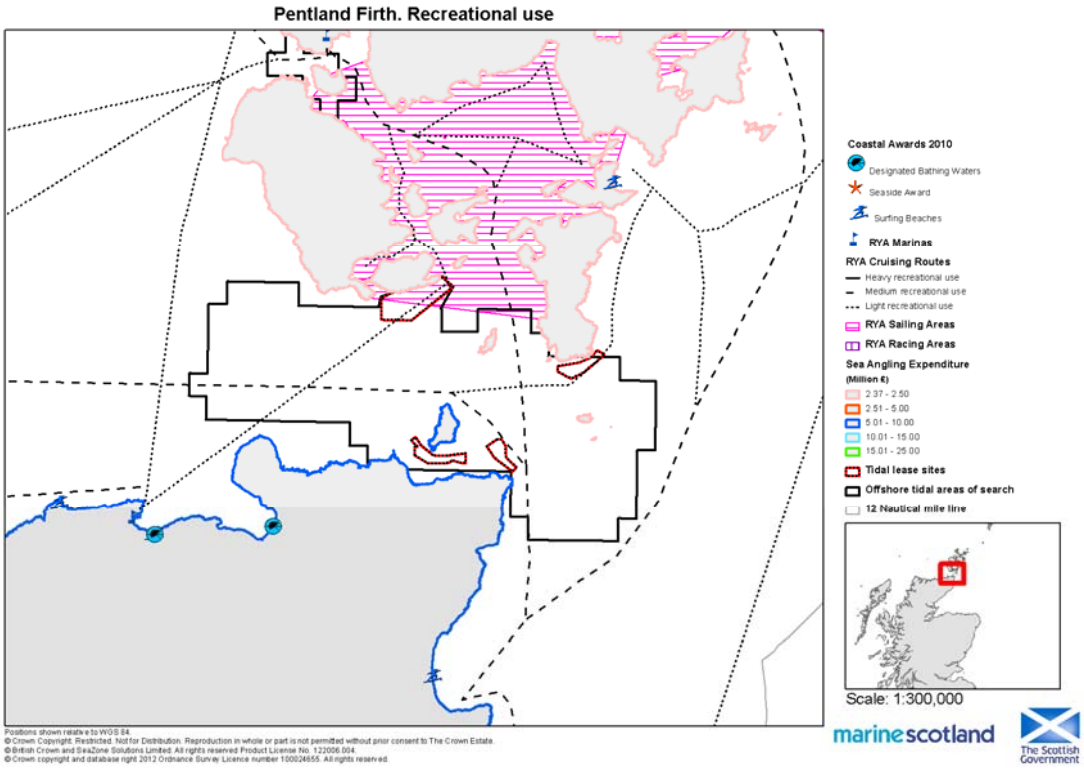


Fig.3.68 Recreational activity in the Orkney & Westray (Areas of Search)

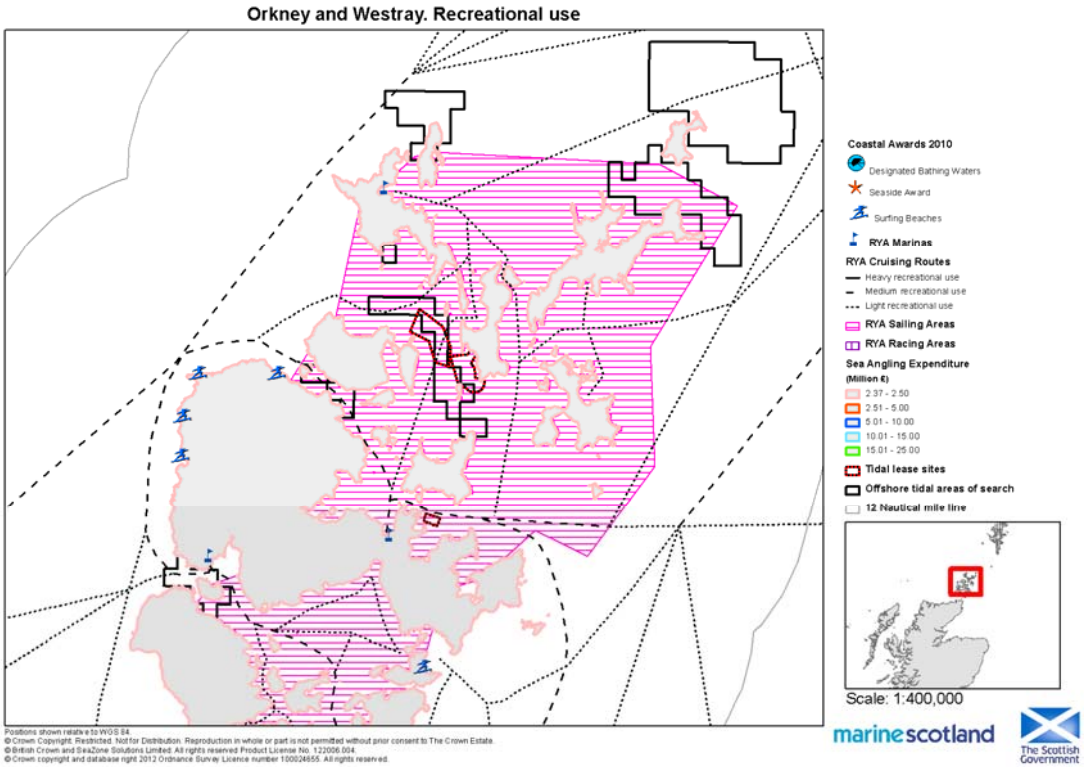
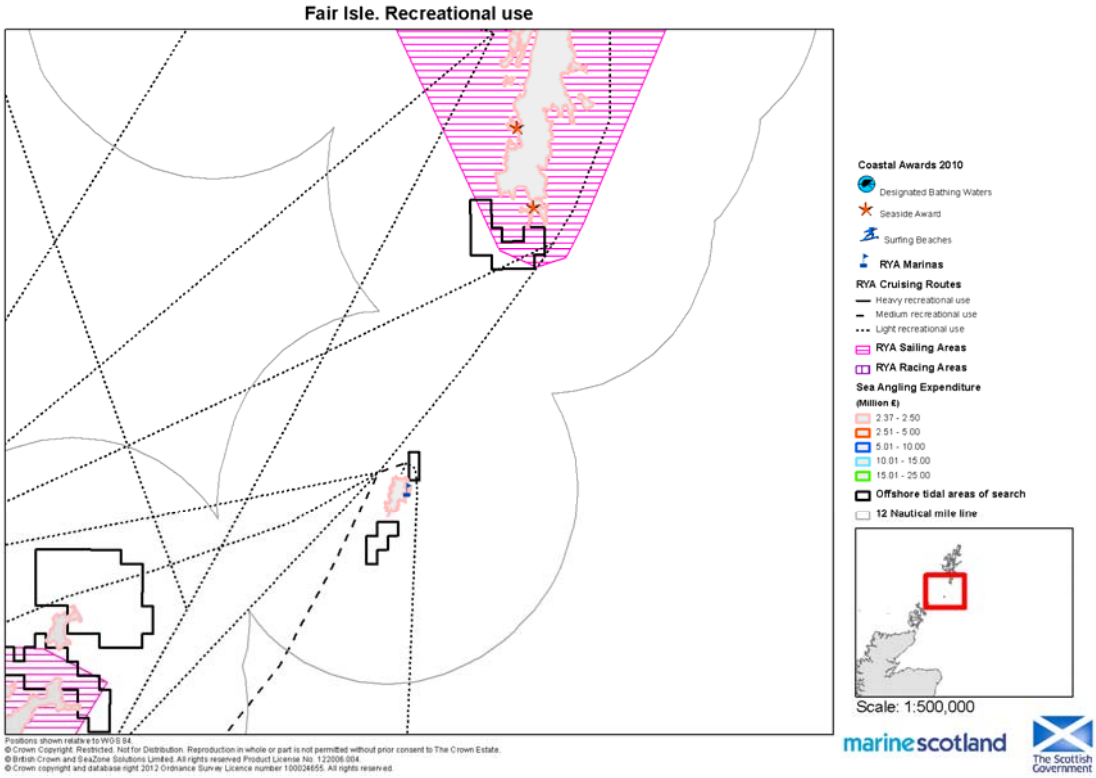


Fig.3.69 Recreational activity in the Sumburgh & Fair Isle (Areas of Search)



3.14 Shipping

3.14.1 The North coast of Scotland from Cape Wrath to Dunnet Head is mainly steep cliffs with few navigational hazards lying in offshore waters. At Dunnet Head, the Pentland Firth separates the Scottish mainland from the Orkney Islands. Midway between South and North Ronaldsay, the Orkney Islands are divided into two parts by the Stronsay Firth and Westray Firth which together form a continuous navigable passage running North West and South East linking the Atlantic to East and West Orkney Islands. Scapa Flow, virtually a small enclosed inland sea, lies in the South part of the group with a navigable entrances open to the Atlantic and Pentland Firth.

3.14.2 Further offshore to the North East of this region is the Island group of The Shetlands. This is composed of about 100 islands; holms and rocks lie with Sumburgh Head as their Southern extremity and stretch some 60 miles North to Muckle Flugga. Toward the Northern end of the group Yell and Bluemull Sounds both have navigable passages. The high and rocky island of Fair Isle also forms part of the Shetlands, and dividing the otherwise deep unobstructed passage collectively known as 'Fair Isle Channel' between Orkney and Shetland Islands (GLA, 2010).

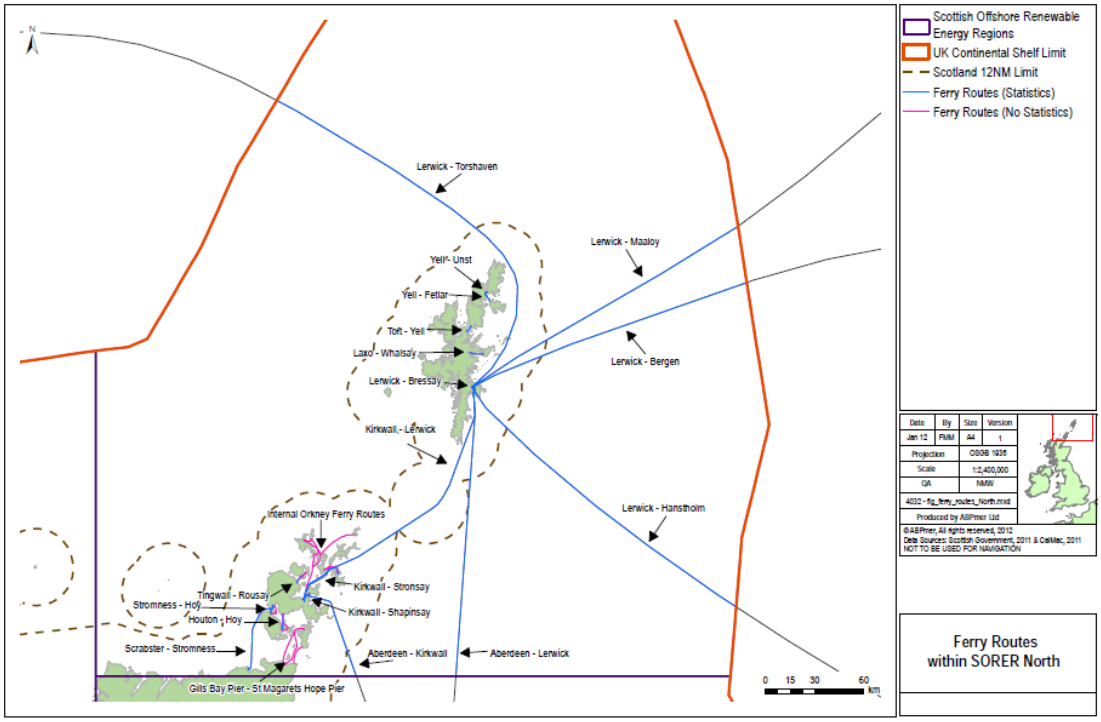
3.14.3 Shipping within the study area includes vessels transiting from the Western Atlantic to the Baltic states and Russia; combined with traffic using Orkney Ports, Shetland Ports and Scottish Ports on the mainland. Most of the transiting traffic uses Pentland Firth, which is one of Scotland's busiest seaways, or travels further North and passes through the Fair Isle Channel.

3.14.4 he Pentland Firth is considered as an International Shipping Lane and provides the shortest route around the North of Scotland and is the only practical access to Scapa Flow and the Flotta oil terminal for large vessels. This intensity of shipping within Pentland Firth is set against a navigational background of strong tidal flows and an area prone to adverse wind and wave conditions.

3.14.5 The MSP Framework for PFOW (Marine Scotland, 2011b) uses Automatic Identification System (AIS) data from the MCA as its main data source, augmented by track surveys carried out in summer and winter period during 2006. This information identifies a range of area usage including a variety of cargo vessels, passenger ferries, recreation and fishing vessels. Orkney ports handled around 1,500 vessel arrivals in 2008, which has been relatively consistent since 1995. Although Slum Voe has seen annual fluctuations in vessel call counts over the study period overall there has been a gradual decline since 1995 to 2008 of 58%. The vessel arrival count for Lerwick has been relatively stable at around 950 per year.

3.14.6 Ferry services in the region provide a lifeline for local communities living in both the Orkneys Island and the Shetland Islands. Ferry routes in the region are shown in Figure 3.?. Orkney Ferries Ltd (run by Orkney Islands Council) operate ferries to thirteen Islands within the Orkney Islands, which provides the transport link to mainland Scotland via larger ferry links to Scrabster, Gills Bay, and Aberdeen. Shetland Islands Council provides the internal ferry system to eight Islands within their area. A direct link also exists from Lerwick to Europe (Bergen, Maaloy, Hanstholm and Torshaven) and from Aberdeen direct to Kirkwall and Lewick.

Fig.3.70 Ferry Routes in the North Region



3.14.7 There is no published information on the specific economic value of shipping to this region. Employment extracted from Office for National Statistics shows that employment in the category 'Sea and Coastal Passenger Water Transport', provides 259 people full time employment in 2010 (see Table 160). There has been a reduction in people employed in 'Sea and coastal freight water transport from 116 in 2009, to 64 in 2010.

Areas of Search

3.14.8 The Pentland Firth area of search south of the Orkney islands is not intersected by any of the established ferry routes. Its westernnmost side finishes short of the Scrabster-Stromness ferry route..

3.14.9 Although this is a busy stretch of water for shipping activity, including cargo and passage vessels ,see Fig 3.?, the activity is predominantly generated by ferry traffic, although larger vessels approach Flotta from the south. This busy traffic lane crosses close to where some tidal lease areas have been agreed at Borough Ness.

3.14.10 Nearly the entirety of the Orkney and Westray section is covered by an ATBA (Area To Be Avoided) so the only vessels likely to be found in these areas are ferries, fishing vessels and recreational craft. Inter-island ferries cross over at the Rousay- Eday, the Sanday-North Ronaldsay and the Hoy-Mainland tidal area of search sites.

3.14.11 Fair Isle is also entirely protected by a voluntary ATBA

- At the south of Fair Isle the tidal area of search is crossed by the ferry line from Orkney (Kirkwall)-Shetland (Lerwick). The north tidal area of search on Fair Isle is likewise crossed by the Lerwick-Fair Isle ferry. Otherwise shipping traffic is low in the Fair Isle areas of search.
- The Sumburgh Head area of search is completely within and ATBA and no ferry or shipping lines cross through its extent.

3.14.12 Figuress 3.71-3.73 show the shipping activity in relation to the Pentland Firth, Orkeny & Westray and Sumburgh & Fair Isle Areas of Search.

Fig.3.71 Shipping activity in the Pentland Firth (Area of Search)

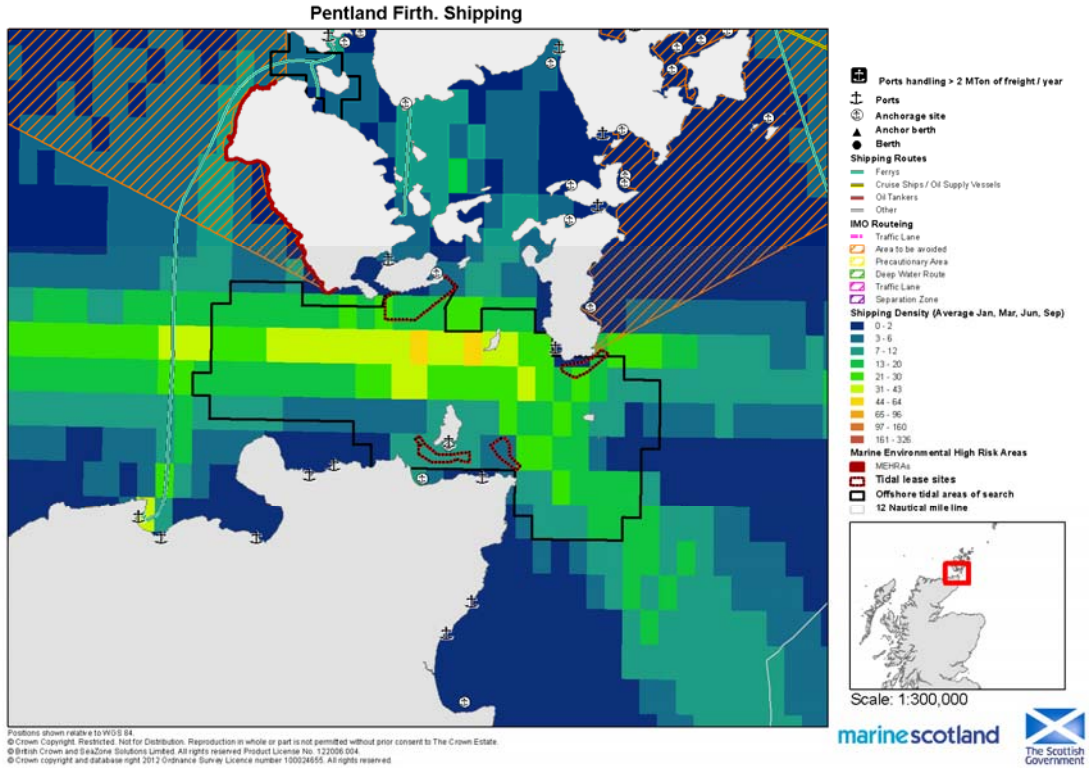


Fig.3.72 Shipping activity in the Orkney & Westray (Areas of Search)

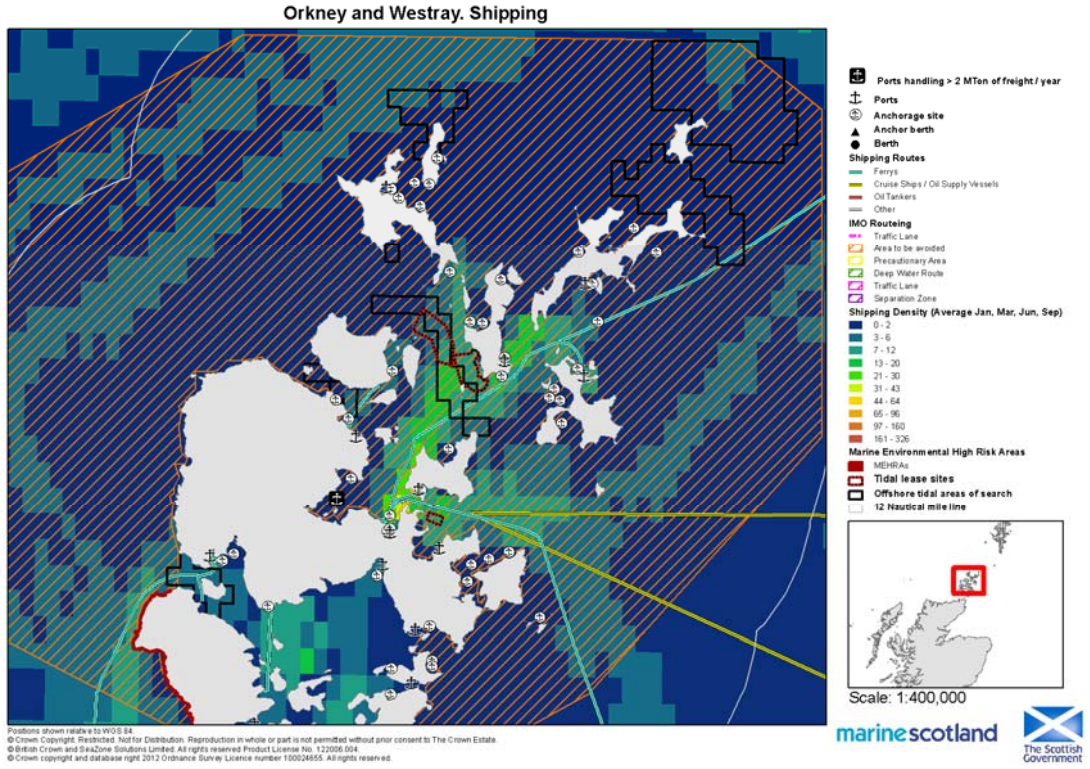
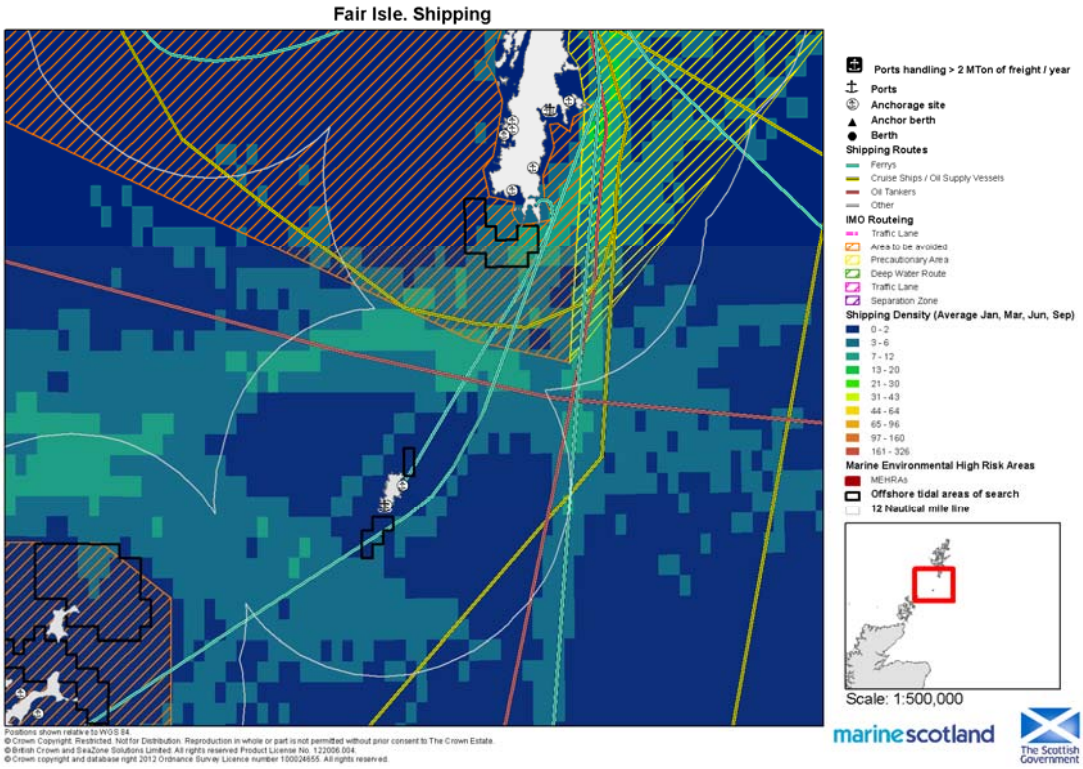


Fig.3.73 Shipping activity in the Sumburgh & Fair Isle (Areas of Search)



3.15 Social Considerations

3.15.1 The total population in North Region is 41,000, it being much more sparsely populated than other regions. The overall average age in the North Region is 40 years old (one year greater than the national average). The working age population declined from a peak of 35,700 in 1996 to around 34,300 in 2002, after which it has levelled off. In 2010, the working age population was 34,500, and the overall change (1996 to 2010) is a reduction of 3.2%. The population of children has declined across the whole period (from 12,700 in 1996 to 10,300 in 2010, equivalent to a reduction of 18.5%) while the number of people of pensionable age has increased by 29.7% (from 9,800 in 1996 to 12,800 in 2010).

3.15.2 Average income in 2009 was higher than the national average for the Shetland Islands but lower for the Orkney Islands. The greatest number of jobs are associated with human health and social work activities (20% of the total for 2010). Other industry sectors accounting for more than 10% of jobs are public administration and defence; compulsory social security at 15%, wholesale and retail at 12%, and education at 10%. Agriculture, forestry and fishing and arts, entertainment and recreation both make up around 3% of all jobs in the North.

3.15.3 Crofting is an important part of the economy and community in Orkney and Shetland (small areas of the NE Highland counties of Caithness and Sutherland are also located in this region, but are not included due to the overlap with other regions). The Orkney area contains 466 crofts with 8035

households in parishes containing crofts. Shetland contains 2755 crofts with 9111 households. Crofting makes up a relatively high percentage of household income in Orkney (47.3%), and is almost double that in Shetland (27.22%). Total income is higher in Shetland than in Orkney (£20,240 in Orkney, £31,020 in Shetland) and income from crofting activities is high in both regions (£12,800 in Orkney, £10,050 in Shetland).

3.15.4 The proportion of people rating their health as good or very good in the Orkney Islands increased from 89.9% (2001/2002) to 90.1% (2007/2008). This compares with a decrease in the Shetland Islands from 92.9% (2001/2002) to 88.3% (2007/2008).

3.15.5 There are 612 coastal datazones for the SIMD in the North, with 78% of all datazones being coastal. No datazones (coastal or all) fall into the 10% most deprived in the North. There is no difference in percentage that are in the most affluent decile for income or housing, but an increase to 10% (from 8%) of coastal zones being in the most affluent decile for employment, and from 5% to 6% for health. These statistics suggest that communities in the North are more likely to be affluent (in the wider sense of quality of life), although only a small proportion of datazones fall into the most affluent 10%.

3.15.6 There has been an increase in the population with no qualifications within this region. The Orkney Islands has the highest proportion of the population with no qualifications in both 2004 (9.9%) and 2008 (11%). The values for the Shetland Islands are 9.1% in 2004, with no change in 2008. The minimum drive time to a college of Further or Higher Education in the North Region varies from 61 minutes in the Shetland Islands to 77 minutes in the Orkney Islands.

3.15.7 House prices for both the Orkney and Shetland Islands are below the national average. In 2010, the national average was £154,078 while the average in the Shetland Islands was £120,157, 22% lower than the national average. The average in the Orkney Islands was £114,153, or 26% lower than the national average. Affordability of housing is likely to be greater in the Shetland Islands (since gross earnings are higher than the national average). Average earnings in Orkney (2009) were around 7% lower than the national average, so affordability in the Orkney Islands may also be greater than for Scotland as a whole.

3.15.8 The highest perceived quality of life in 2007/2008 was in the Orkney Islands, where 77.9% rated their neighbourhood as good or very good. The Shetlands Islands was only slightly lower at 77.6%. Both local authority areas have shown a considerable increase since 1999/2000 in the population rating their neighbourhood as very good or good. The increase in the Orkney Islands is 15.8% and in the Shetland Islands is 12.5%.

3.15.9 Average electricity consumption (per household) in the North Region was 10.4 MWh in 2009 (compared with an overall estimated average per household for Scotland of 5.7 MWh). Those households where the highest income earner (HIH) is 60+ are more likely to be in fuel poverty than the

whole population in 2007/2009. At 63.9%, this is much higher than the national average of 45.9% for this group. The percentage of HIH 60+ in fuel poverty has, though, decreased between 2005/2008 and 2007/2009. The proportion of households with HIH 60+ that are in fuel poverty is very similar for the Shetland Islands (63.3%) and Orkney Islands (64.4%). In terms of change, though, there has been a much greater reduction in the proportion of the total population in fuel poverty in the Orkney Islands (-11.3%) than in the Shetland Islands (-3.5%).

Future Trends

3.15.10 Table 3.4 summarises the statistics and trends discussed above to give an indication of the likely future changes by indicator, comparing national with local trends (where data are available). There is much greater uncertainty over trends for the time period of 30 to 50 years and, in both cases, it is assumed that future trends follow recent and historic trends.

Table 3.4 Summary of future trends in North Region

Indicator	National		Regional		Evidence for Trend
	10-20 years	30-50 years	10-20 years	30-50 years	
Average age	↑	↑	↑	↑	Estimate of proportion of the population that is of pensionable age between 2001 and 2010
Working age population	↑	→	↓	→	Recent trends suggest a slight decrease in the number of people of working age
Income	↑	↑	↑	↑	Recent trends suggest increase in median weekly income over time, but there have been recent fluctuations
Health	↑	→	↕	↕	Recent trends suggest uncertainty due to regional differences
Perception that neighbourhood is a very good place to live	↕	↕	↑	↑	Regional trends suggest small increases, but with recent fluctuations
Affordability of housing	↑	→	↑	→	Suggestion that affordability has increased recently, but this may not be sustained. Data on house prices and mean income suggests houses should be more affordable than for Scotland as a whole, but social sector debt is much higher

Indicator	National		Regional		Evidence for Trend
	10-20 years	30-50 years	10-20 years	30-50 years	
Housing quality	↑	↑	↑	↑	Housing quality, as measured by percentage of housing failing the SHQS, is improving, although the definition used in the standard has changed over time, making this difficult to confirm
Energy consumption	↓	↕	↓	→	Recent trends suggest potential for continued slight decline, in longer term is more uncertain
Fuel poverty	↑	→	↑	→	Recent trends show an overall increase even though the Scottish Government policy is that there should be no fuel poverty in the medium to long-term. HIH 60+ and disability or long-term sick have has shown recent decreases
Key: ↑: indication of upward trend →: no significant change up or down expected ↓: indication of downward trend ↕: uncertain trend could be up or down					

3.16 Supply chain

3.16.1 There are a number of ports within the Northern Region which support the Pentland Firth and Orkney Waters commercial leasing round for wave and tidal energy projects.

3.16.2 The N-RIP Stage 2 Report also includes the following ports in the North Region which initial assessments suggest may be suitable locations to develop wave and tidal supply chain activities:

- Sella Ness
- Lerwick
- Lyness
- Hatston (Kirkwall)
- Scrabster
- Wick

3.16.3 The Pentland Firth and Orkney Waters area has recently been classified as a Marine Energy Park. The purpose of the park is to heighten the international profile of the region and its reputation as a world leader in marine energy. The park builds on collaborative partnerships in the region

between government on the main land and the Orkney Islands, Highlands and Islands Enterprise(HIE), plus a cluster of local expertise and renewable resource in the area, in order to heighten the progress of marine power development.

3.16.4 Based in Orkney, The European Marine Energy Centre (EMEC) Ltd is the first and only centre of its kind in the world to provide developers of both wave and tidal energy converters – technologies that generate electricity by harnessing the power of waves and tidal streams – with purpose-built, accredited testing facilities. The Centre 14 full-scale test berths, and two nursery test sites where smaller scale devices, or those at an earlier stage in their development, can gain real sea experience in less challenging conditions than those experienced at the full-scale wave and tidal test sites.

3.16.5 Beyond device testing, EMEC also provide independently-verified performance assessments, a wide range of consultancy and research services, and are working closely with Marine Scotland to streamline the consenting process. Further information is available at www.emec.org.uk

3.16.6 In addition to EMEC, there are a number of firms operating in the region with offer consultancy services in relation to the development of wave and tidal energy. More information can be found at www.hie.co.uk

3.16.7 The North Region has established oil and gas supply chain activities taking place within the region in locations such as Lerwick. It is therefore likely that skills in areas such as in marine engineering, operations, maintenance and bespoke manufacturing which are already established, will be suitable for application in the wave and tidal energy sectors.

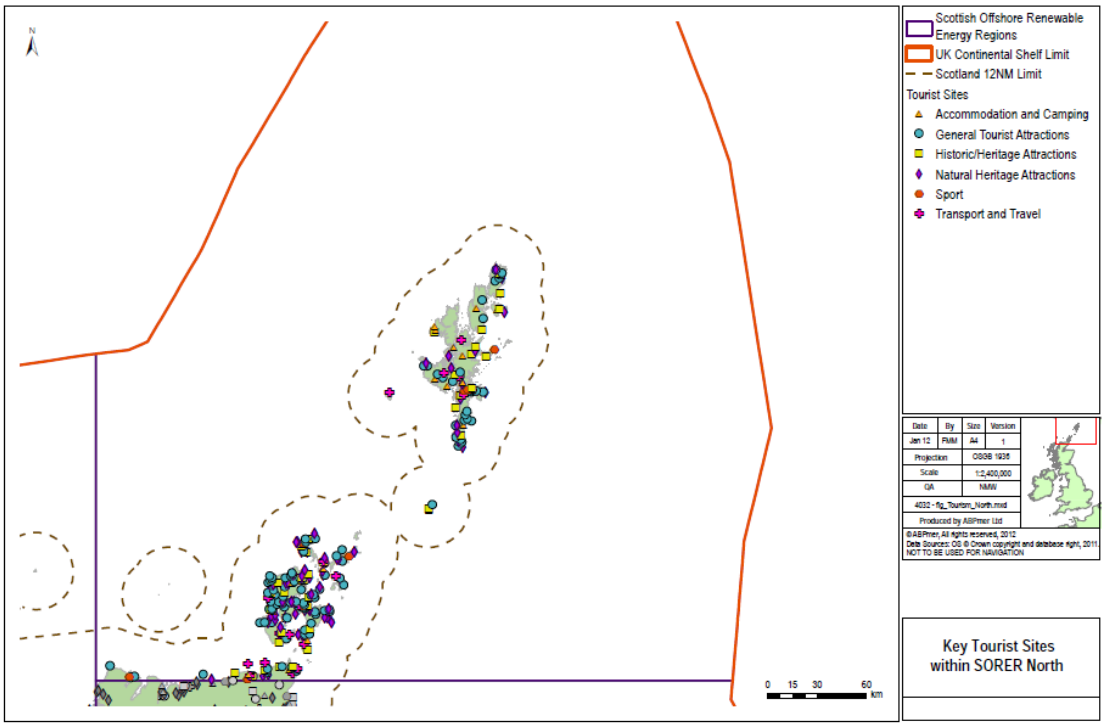
3.16.8 Energy North is a trade organisation that focuses on the Energy sector and covers the North East Region. It covers the North of Scotland and Argyll areas currently has 150 members from the oil and gas, renewables, engineering, fabrication and nuclear decommissioning sectors.

3.16.9 In terms of educational facilities, there is the International Centre for Island Technology (ICIT) – Heriot Watt in Orkney, which provides MSc courses in renewable energy.

3.17 Tourism

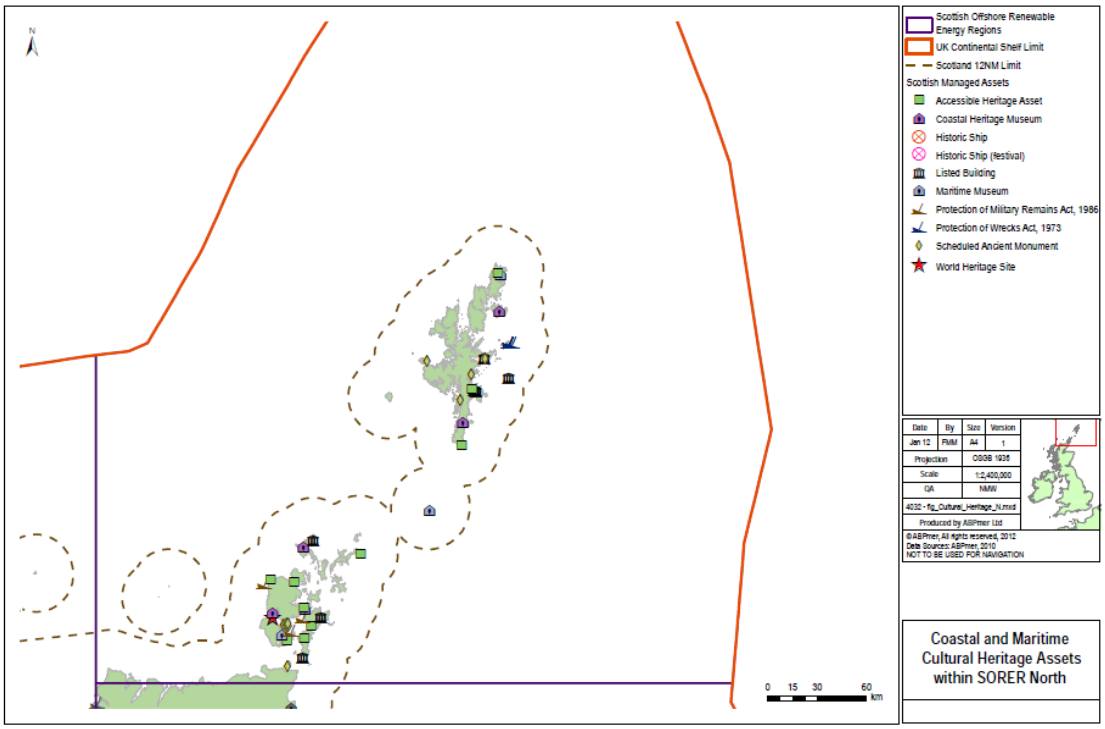
3.17.1 Tourist sites in North Scotland include a range of attractions, with a considerable concentration of general tourist attractions on Orkney (Figure 3.74).

Figure 3.74 Key tourist sites in the North Region



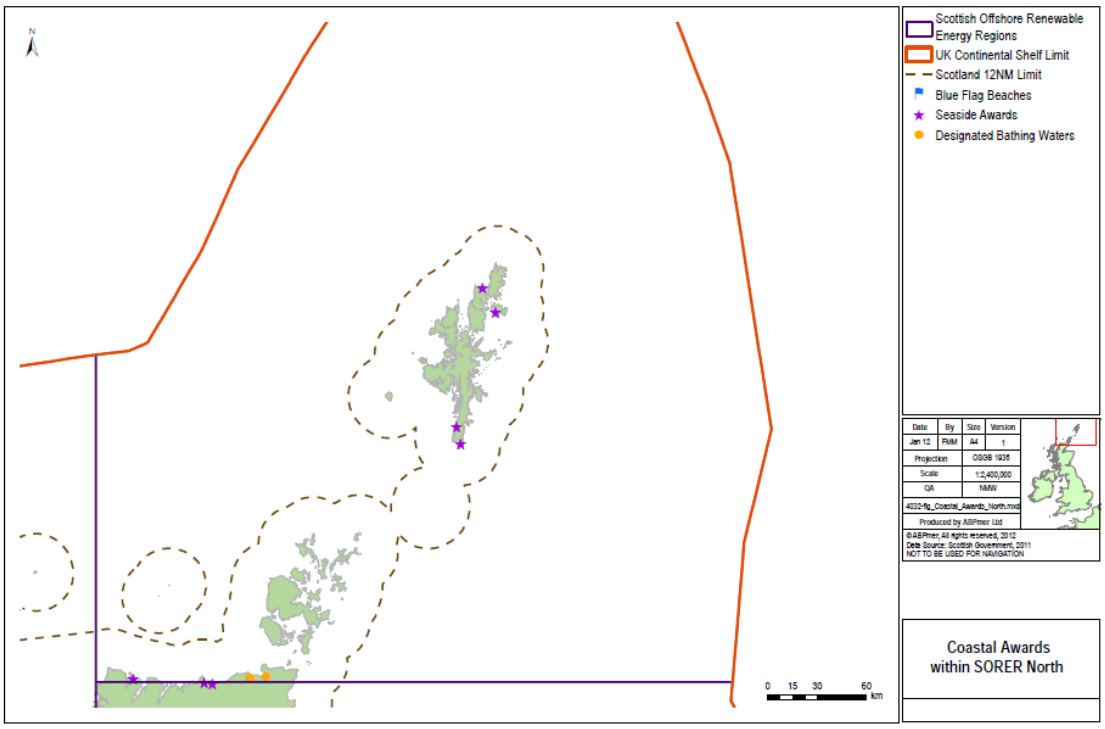
3.17.2 Historic/heritage attractions and natural heritage attractions also feature in significant numbers on both Orkney and Shetland. Figure 3.75 shows the locations of coastal and maritime cultural heritage assets, including the World Heritage Site on Orkney. The Heart of Neolithic Orkney was designated as a World Heritage Site in 1999 and includes the tomb of Maeshowe, the Stones of Stenness, the Barnhouse Stone, the Watchstone, the Ring of Brodgar and associated monuments and stone settings, and the Skara Brae settlement.

Figure 3.75 Cultural and Maritime Heritage Assets in North Region



3.17.3 Within the region, there are additionally several areas with seaside awards (see Figure 3.76). These include Sango Sands, Strathy Bay and Melvich Beach along the North coast, as well as some sites on Shetland. There are also a couple of designated bathing waters at Thurso and Dunnet. The importance of natural marine resources is also illustrated by this region having nine Marine SACs, mainly in areas around the Northern Islets.

Figure 3.76 Coastal awards in the North Region



3.17.4 While visitor numbers for the whole region are not readily available, it was possible to obtain data for Shetland and Orkney from VisitScotland. Data for 2009 indicate that UK visitors made around 70,000 trips to Orkney, stayed for some 400,000 nights and spent approximately £30 million. Considering Shetland, UK visitors made around 40,000 trips, stayed for around 250,000 nights and spent approximately £12 million (VisitScotland, 2010).