MPA search feature descriptions catalogue

14th and 15th March, 2012

Heriot-Watt University, Edinburgh

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INTRODUCTION

This report represents a descriptive catalogue of the MPA search features being used to underpin the identification of Nature Conservation MPAs in Scotland's seas. Whilst derived from available existing accounts, the succinct 1-page descriptions are written from a Scottish perspective, refining, but clearly linking to more generic UK, EC or OSPAR (Oslo and Paris Commission) commentary. Available information on the geographic distribution of the features from GeMS is provided as a summary map in each description.

The list comprises 21 broad habitats (e.g. burrowed mud), five low or limited mobility species (e.g. Iceland cyprine) and 10 mobile species, including fish (e.g. blue ling), marine mammals (e.g. minke whale) and black guillemot. Descriptions are also presented for five large-scale features considered to be of functional significance for the overall health of Scottish seas.

Since publication of the Scottish MPA Selection Guidelines, European spiny lobster, burrowing sea anemone aggregations and heart cockle aggregations were removed as drivers in the identification of Nature Conservation MPAs.

MPA search features

[1] No longer being considered as drivers for identification in the MPA network following Workshop 3.

Page no.

LARGE-SCALE FEATURES

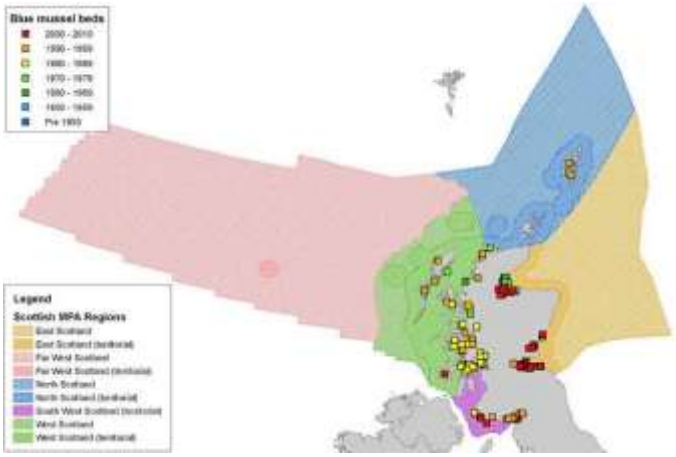
Broad habitat

BLUE MUSSEL BEDS

Image

Image: Paul Naylor

Distribution



Feature description

Characteristics - At high densities, blue mussels (*Mytilus edulis*) form beds or reefs in the intertidal or subtidal, composed of a single or multi-layered framework, held together by byssus threads. The bed stabilises sediment and creates a habitat for a diverse community of animals, living on, within, or under the bed, and within the underlying sediment. Includes several biotopes depending on the sediment on which in occurs (e.g. **Myt.Sa** on sand, **Myt.Mu** on mud and **Myt.Mx** on mixed), the abundance of fanworms (**MytFab**), and if it occurs in the subtidal (in **MytSS**) or on reduced salinity rock (**MytRS**).

Environmental preferences - A variety of rock and sediment types in the intertidal and subtidal (0-30m), and in a range of conditions from open coasts to estuaries, marine inlets and deeper offshore.

Scottish distribution - Found in scattered locations around Scottish coasts, particularly at the head of sea lochs and in the mouths of estuaries and firths.

Wider distribution - Widely distributed across the UK.

Feature status - Blue mussel beds are important for ecosystem function, as they stabilise sediment, are involved in nutrient cycling, provide hard substratum in sedimentary areas which increases biodiversity, and are a food source for wildfowl, seabirds and humans. In the intertidal, beds may be exposed to damage from commercial fisheries and harvesting, bait digging, coastal development, chemical pollution and activities that physically disturb the bed and, in the subtidal, to anchoring and demersal fishing operations (targeted or accidental). Only the sedimentary biotopes are listed by UK BAP while only littoral beds on mixed or sandy sediments are listed on the OSPAR Threatened / Declining list (T&D).

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D (not all components)
UK BAP

Information sources

JNCC Marine Habitat Classification (littoral)
JNCC Marine Habitat Classification (sublittoral)
OSPAR Case Report
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Mytilus edulis beds on littoral sediments - **LS.LBR.LMus.Myt** (v04.05), LR.SLR.Mx.MytX (v97.06), A2.721 (EUNIS). Includes: *Mytilus edulis* beds on littoral mixed substrata - **LS.LBR.LMus.Myt.Mx** (v04.05), A2.7211 (EUNIS); *Mytilus edulis* beds on littoral sand - **LS.LBR.LMus.Myt.Sa** (v04.05), A2.7212 (EUNIS); & *Mytilus edulis* beds on littoral mud - **LS.LBR.LMus.Myt.Mu** (v04.05), A2.7213 (EUNIS)). *Mytilus edulis* and *Fabricia sabella* in littoral mixed sediment - **LS.LSa.St.MytFab** (v04.05), LS.LMX.MytFab (v97.06), A2.212 (EUNIS). *Mytilus edulis* beds on sublittoral sediment - **SS.SBR.SMus.MytSS** (v04.05), IMX.MytV (v97.06), A5.625 (EUNIS). *Mytilus edulis* beds on reduced salinity infralittoral rock - **IR.LIR.IFaVS.MytRS** (v04.05), IR.SIR.EstFa.MytT (v97.06), A3.361 (EUNIS).

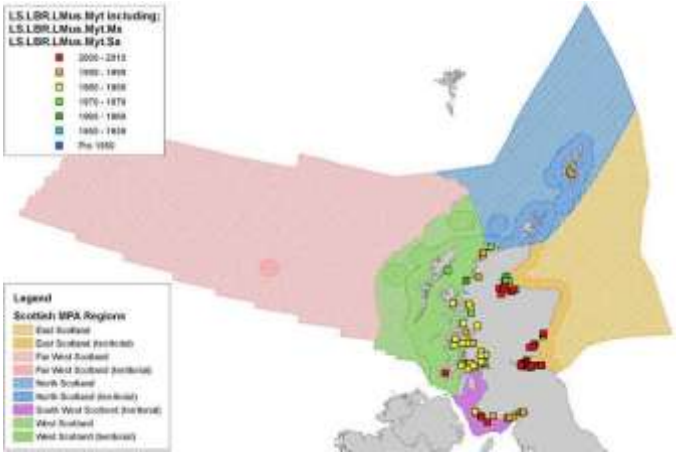
Component biotope name

***MYTILUS EDULIS* ON LITTORAL SEDIMENTS (LS.LBR.LMUS.MYT)**

Image

Image: SNH

Distribution



Feature description

Characteristics - At high densities, blue mussels (*Mytilus edulis*) form beds or reefs in the intertidal, composed of a single or multi-layered framework, held together by byssus threads. The bed stabilises sediment, and creates a habitat for a diverse community of animals, living on, within, or under the bed, and within the underlying sediment. The mussels may have fucoid algae attached or be encrusted with barnacles. Winkles and small shore crabs are common amongst the mussels, whilst areas of sediment may contain lugworms, cockles, and other buried animals.

Environmental preferences - Found on exposed to extremely sheltered, littoral sediment shores.

Scottish distribution - Known to occur around Scotland, with the majority of records from the west coast and from the Firth of Forth and Moray Firth on the east.

Wider distribution - Widely distributed around the UK.

Feature status - Blue mussel beds are important for ecosystem function, as they stabilise sediment, are involved in nutrient cycling, provide hard substratum in sedimentary areas which increases biodiversity, and are a food source for wildfowl, seabirds and humans. They may be exposed to damage from commercial fisheries and harvesting, bait digging, coastal development, chemical pollution and activities that physically disturb the mussel bed.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D (Myt.Sa & Myt.Mx only)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
OSPAR Case Report
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

Mytilus edulis beds on mixed littoral sediment - **LS.LBR.LMus.Myt.Mx** (v04.05), LR.SLR.MX.MytX (v97.06), A2.7211 (EUNIS). *Mytilus edulis* beds on littoral sand - **LS.LBR.LMus.Myt.Sa** (v04.05), LR.SLR.MX.MytX (v97.06), A2.7212 (EUNIS). *Mytilus edulis* beds on littoral mud - **LS.LBR.LMus.Myt.Mu** (v04.05), LR.SLR.MX.MytX (v97.06), A2.7213 (EUNIS).

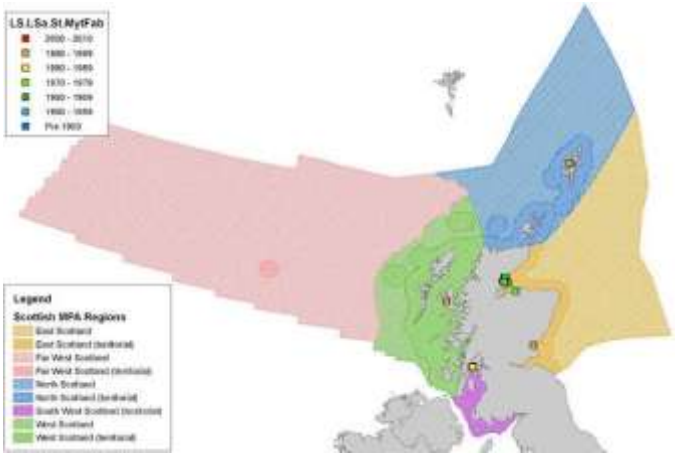
Component biotope name

***MYTILUS EDULIS* AND *FABRICIA SABELLA* IN LITTORAL MIXED SEDIMENT (LS.LSA.ST.MYTFAB)**

Image

Image: SNH

Distribution



Feature description

Characteristics - High densities of juvenile blue mussels (*Mytilus edulis*) on pebbles, gravel, sand and shell debris with mud and a strandline of fucoid algae. The mussels form a thin bed, with the fanworm (*Fabricia sabella*) amongst the cobbles and algal holdfasts. Other bivalves, polychaete and oligochaete worms are common in the sediment.

Environmental preferences - Occurs on extremely sheltered to sheltered, mixed sediment shores in fully marine conditions e.g. sheltered firths.

Scottish distribution - Scattered records around Scotland, in Loch Ridden, Loch Bracadale, Dornoch Firth, Moray Firth, the Tay Estuary, and the Houb of Fugla Ness in Shetland.

Wider distribution - No records outside of Scotland.

Feature status - An unusual (and hence uncertain) example of a mussel bed at the strandline, only know from a few locations in Scotland. Mussel beds stabilise sediment, are involved in nutrient cycling, provide hard substratum in sedimentary areas which increases biodiversity, and are a food source for wildfowl, seabirds and humans. It may be exposed to damage from trampling, harvesting, bait digging, coastal development, chemical pollution and activities that physically disturb the mussel bed.

Natural heritage importance

Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

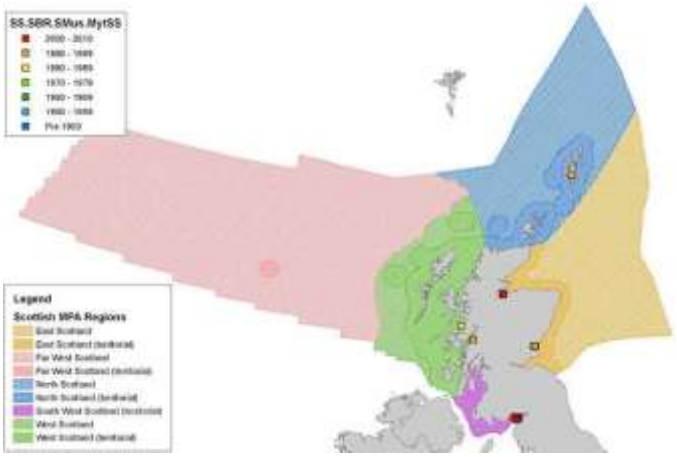
Component biotope name

***MYTILUS EDULIS* BEDS ON SUBLITTORAL SEDIMENT (SS.SBR.SMUS.MYTSS)**

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - At high densities, blue mussels (*Mytilus edulis*) form beds on the sublittoral sediment, composed of a multi-layered framework, held together by byssus threads. The bed stabilises sediment, and creates a habitat for a diverse community of animals, living on, within, or under the bed, and within the underlying sediment. Amphipods and polychaete worms are found living within the bed and in the sediment. Crabs, sea anemones, whelks and starfish are found on the sediment and amongst the mussel bed.

Environmental preferences - Moderately strong to strong water movement on shallow, sublittoral mixed sediment (0-20m). The biotope occurs in fully marine coastal habitats and sometimes in variable salinity conditions in the outer regions of estuaries.

Scottish distribution - Sublittoral beds are known from the Solway Firth, Loch Creran, Loch Ailort, the Firth of Tay and Whiteness Voe in Shetland.

Wider distribution - Recorded in the UK from Eastbourne to Weymouth in coastal waters and in the Irish Sea.

Feature status - Blue mussel beds are important for ecosystem function, as they stabilise sediment, are involved in nutrient cycling, provide hard substratum in sedimentary areas which increases biodiversity, and are a food source for wildfowl, seabirds and humans. They may be exposed to damage from anchoring, coastal development, chemical pollution and activities that physically disturb the mussel bed such as to demersal fishing operations (targeted or accidental).

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

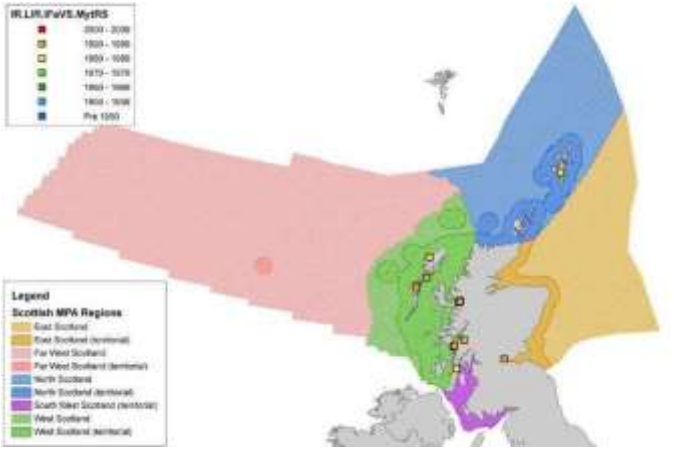
Component biotope name

***MYTILUS EDULIS* BEDS ON REDUCED SALINITY INFRALITTORAL ROCK (IR.LIR.IFAVS.MYTRS)**

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Dense beds of the mussel *Mytilus edulis* with some barnacles and a variety of other species attached to the mussel shells, including seaweeds, sea firs and sea mats. Starfish may be also common on this biotope.

Environmental preferences - In tide-swept entrances to enclosed basins such as those of sea lochs, particularly where the loch basins have a reduced salinity. Preference for sheltered and very sheltered locations, with a range of tidal streams, to a depth of 5m.

Scottish distribution - Few records currently exist but the majority are in Scottish waters, including in Shetland (Stromness Voe), along the west coast (e.g. Loch Long, Loch Etive, Loch Tarbert and the Firth of Lorn), and in the Outer Hebrides (e.g. Ob Cheannullag, Lewis and Ardvey tidal pond, Harris). Generally found in sheltered areas in sea lochs.

Wider distribution - Only two British records outside of Scotland; both in the south-west of England.

Feature status - Most UK records for this biotope occur in Scottish lochs. Like other blue mussel beds, they may be exposed to damage from coastal development, chemical pollution and activities that physically disturb the bed such as demersal fishing operations (targeted or accidental).

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

No sub-component biotopes

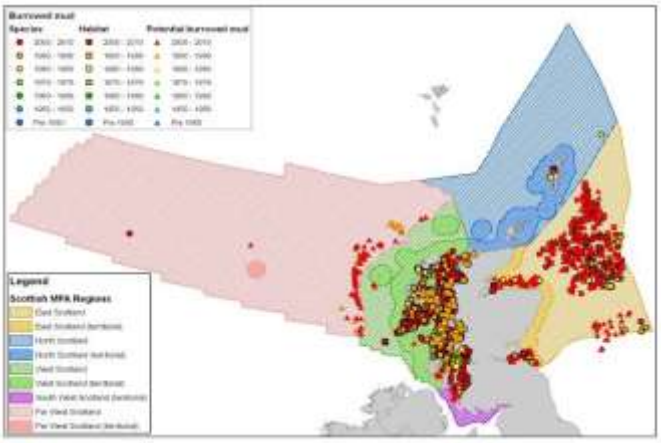
Broad habitat

BURROWED MUD

Image

Image: Paul Naylor

Distribution



Feature description

Characteristics – Areas of finer sediments that are home to a range of burrowing crustaceans, including langoustine *Nephrops norvegicus*, the mud shrimps *Calocaris macandreae*, *Callianassa subterranean*, or *Maera loveni* and the crab *Goneplax rhomboides*. The burrowing action of these species makes burrows and mounds a prominent feature of this habitat. In some areas, burrowed mud may support conspicuous populations of seapens, so called due to their resemblance to feather quills. Typically the species *Virgularia mirabilis* and *Pennatula phosphorea* are present, although in deeper waters off the continental shelf, *Kophobelemnon stelliferum* and *Umbellula encrinus* may be recorded. This habitat can also support populations of the spectacular fireworks anemone (*Pachycerianthus multiplicatus*), and the scarce tall seapen (*Funiculina quadrangularis*) (**SpnMeg.Fun**). Large mounds of mud may also be found where the spoon worm (*Maxmuelleria lankesteri*) is present (**MegMax**).

Environmental preferences - This habitat is found in areas of fine mud, sandy mud and muddy sand in water depths ranging from 10 m to greater than 500 m. The habitat is found in a range of environments, including sheltered muddy basins of sea lochs and voes, in full or variable salinities, and in deep water on the open coast.

Scottish distribution - Scottish sea lochs and the northern North Sea support an estimated 95% of British records of burrowed mud habitat.

Wider distribution - Deep offshore waters in the Irish Sea, within Norwegian fjords and from north Bay of Biscay.

Feature status - The component biotopes identified fully encompass the OSPAR Threatened and Declining (T&D) habitat '*Seapen and burrowing megafauna communities*'. Scottish records of this habitat are of international importance and can support populations of the nationally scarce tall seapen. Marine fish farms sited within Scottish sea lochs may have direct effects on the habitat (smothering, nutrient enrichment and the introduction of chemicals) but the scale of threat is considered low. Bottom trawling for *Nephrops* is likely to cause severe physical disturbance and a decline in species richness, with large slow growing species such as seapens and fireworks anemones particularly at risk.

Natural heritage importance

OSPAR T&D

Information sources

OSPAR Background Document
UK BAP Habitat Definitions

Component biotopes and species in Scottish waters

Biotopes - Seapens and burrowing megafauna in circalittoral soft mud - **SS.SMu.CFiMu.SpnMeg** (v04.05), CMU.SpMeg (v97.06), A5.361 (EUNIS), including; **SS.SMu.CFiMu.SpnMeg.Fun** (v04.05), CMU.SpMeg.Fun (v97.06), A5.3611 (EUNIS). Burrowing megafauna and *Maxmuelleria lankesteri* in circalittoral mud - **SS.SMu.CFiMu.MegMax** (v04.05), A5.362 (EUNIS).
Species - Tall seapen *Funiculina quadrangularis*; fireworks anemone *Pachycerianthus multiplicatus*; and the mud burrowing amphipod *Maera loveni*.

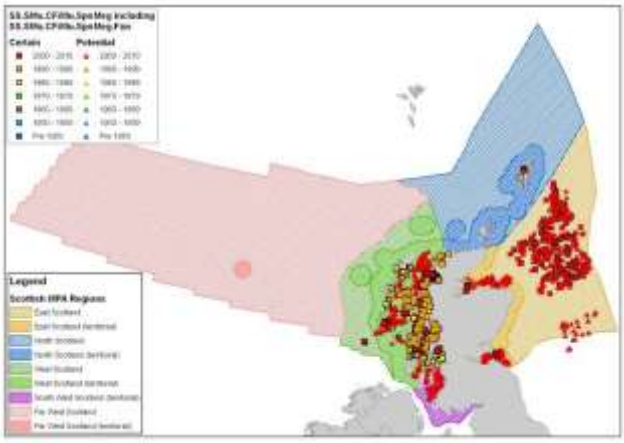
Component biotope name

SEAPENS AND BURROWING MEGAFAUNA IN CIRCALITTORAL FINE MUD (SS.SMU.CFIMU.SPNMEG)

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - Stable circalittoral mud with populations of distinctive phosphorescent and slender seapens which protrude from the surface. In deeper waters off the continental shelf, other seapen species such as *Kophobelemnon stelliferum* and *Umbellula encrinus* may be recorded. The mud itself is marked by prominent mounds and burrows created by megafauna such as langoustine (*Nephrops norvegicus*), mud shrimps and Fries' goby that live within the sediment. The burrows of the different species may interconnect and offer shelter to a range of smaller animals, thus increasing overall biological diversity. Brittlestars, worms and bivalves live in or on the sediment while crabs and starfish scavenge across the muddy sea bed. In some areas, this habitat can support populations of the nationally scarce tall seapen *Funiculina quadrangularis*.

Environmental preferences - This habitat occurs in relatively shallow but sheltered muddy basins of sea lochs and voes, at depths of 10-180m in full or variable salinities and in deep water on the open coast and in waters further offshore and on the continental slope (depths greater than 500m).

Scottish distribution - Extensively distributed throughout sheltered sea lochs, voes and other open coast muddy habitats on the west coast of Scotland, as well as the continental slope. There are notable records in offshore waters of the northern North Sea..

Wider distribution - Recorded from the north-eastern Irish Sea, within Norwegian fjords and from north Bay of Biscay.

Feature status - The majority of UK records of this biotope occur in Scotland. Marine fish farms sited within Scottish sea lochs may have direct effects on the habitat (smothering, nutrient enrichment and chemicals pollution) but the scale of threat is considered low. Bottom trawling for *Nephrops* is likely to cause severe physical disturbance and a decline in species richness within this habitat, with large slow growing species such as seapens particularly at risk.

Natural heritage importance

OSPAR T&D

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Background Document

Sub-component biotopes in Scottish waters

Seapens, including *Funiculina quadrangularis*, and burrowing megafauna in undisturbed circalittoral fine mud - **SS.SMu.CFiMu.SpnMeg.Fun** (v04.05), CMU.SpMeg.Fun (v97.06), A5.3611 (EUNIS).

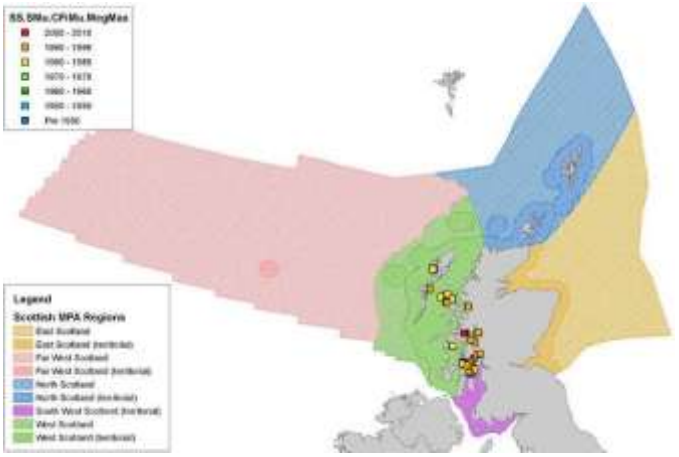
Component biotope name

BURROWING MEGAFAUNA AND *MAXMUELLERIA LANKESTERI* IN CIRCALITTORAL MUD (SS.SMU.CFIMU.MEGMAX)

Image

Image: David Hughes

Distribution



Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2011

Feature description

Characteristics - This biotope comprises circalittoral mud habitat that supports populations of burrowing megafauna, such as mud shrimps and *Nephrops*, whose complex burrows give the mud surface a pitted appearance. The sea bed may be marked by large mounds formed by the spoon worm, *Maxmuelleria lankesteri*. Slender seapens may occur occasionally but in low densities. Polychaete worms, brittlestars and bivalves also live within the mud, while swimming crabs, hermit crabs and starfish scavenge on the surface.

Environmental preferences - Largely found in the muddy basins of sheltered to extremely wave-sheltered sea lochs, at depths of 10-100m in full or variable salinities.

Scottish distribution - Found within a small number of sea lochs on the west coast of Scotland (e.g. Loch Sween, Loch Fyne, Loch Sunart and Loch nam Madadh) and the Sound of Canna.

Wider distribution - Very few records of this biotope outside of Scotland, but it has been recorded off the Isle of Wight and Lundy Island.

Feature status - The majority of UK records of this biotope occur in Scotland. Bottom trawling for *Nephrops* is likely to cause severe physical disturbance and a decline in species richness. Anti-parasitic chemicals used in nearby salmon farming facilities can be toxic to benthic organisms inhabiting this biotope, particularly crustaceans.

Natural heritage importance

OSPAR T&D

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Background Document

Sub-component biotopes in Scottish waters

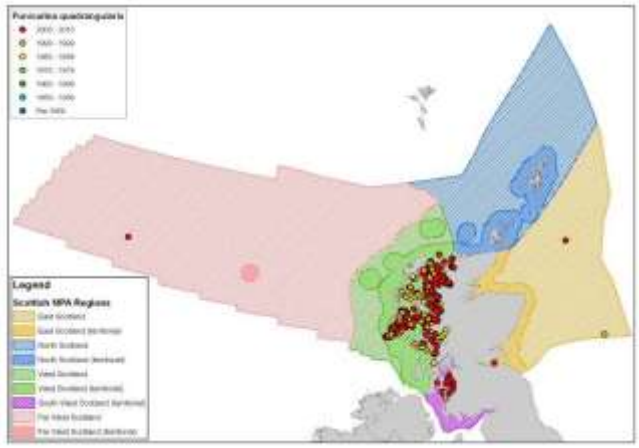
No sub-component biotopes

Common name - *Scientific name*	Species group
TALL SEAPEN - *FUNICULINA QUADRANGULARIS*	**Sea anemones, sea fans and seapens**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - Seapens have a stiff central axis, which supports a colony of miniature sea anemones (polyps). Their name is derived from their appearance which resembles a feather quill. The tall seapen is the most spectacular and largest of the seapens recorded in Britain, occasionally reaching 2m in height. The polyps are soft bodied, white or pale pink in colour, and grow in irregular rows at angles to the hard chalky white axis.

Habitat - Found in muddy and sandy substrata in deep sheltered waters. Within sea lochs they have been recorded as shallow as 20m; however, on the open coast in waters further offshore they are found in water deeper than 100m and down to 2000m.

Feeding - Feeds on suspended organic particles and plankton.

Scottish distribution - Found across western Scotland and the Hebrides. Abundant in Loch Sunart, Loch Teacuis, Loch Duich and Loch A Chairn Bhain on the mainland and in Loch Seaforth, Lewis. A few records occur in the Firth of Clyde. Offshore there are records from the northern North Sea in the Fladen grounds, and Hatton Bank in the deep waters to the west of Scotland.

Wider distribution - Recorded from the North Atlantic, Mediterranean, New Zealand and Japan.

Feature status - The brittle nature of the axial rod and the inability of this species to withdraw into the sediment make it extremely sensitive to physical disturbance. Fishing with static gears (creels) can reduce tall seapen density but the impacts are not as severe as those seen with mobile gear (bottom trawling). Fragmented populations are vulnerable to local extinction and inshore Scottish populations are of global importance.

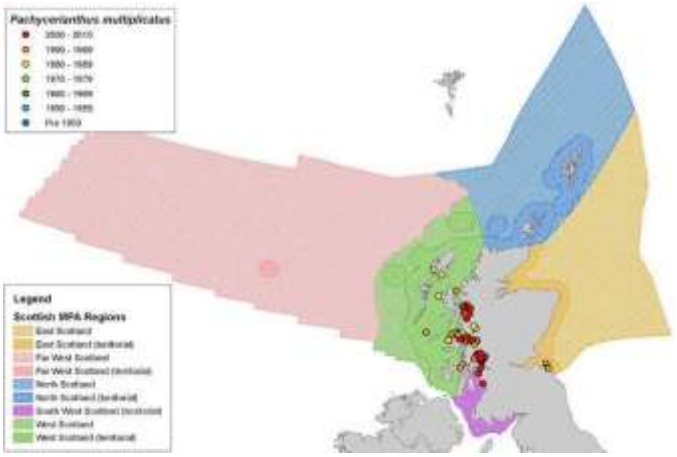
Natural heritage importance	Information sources
UK BAP	ARKive MarLIN

Common name - *Scientific name*	Species group
FIREWORKS ANEMONE - *PACHYCERIANTHUS MULTIPLICATUS*	**Sea anemones, sea fans and seapens**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - A magnificent, large burrowing sea anemone with tentacles spanning 30cm, a column reaching 30cm tall from the sediment, and a buried tube over 1m in length. The short inner tentacles are usually pale beige or chestnut in colour and the longer marginal tentacles are whitish with fine brown bands, or plain white. There are up to 200 very long marginal tentacles that cannot be retracted into the column but coil spirally on disturbance, giving the fireworks anemone a flower like appearance. Occasionally it may have hues of pink or yellow colours.

Habitat - Located in mud or muddy sand sediments in water depths ranging from 10 to 210m. Largely restricted to very sheltered conditions with very weak tidal regimes such as those near the head end of sea lochs but also recorded on the open coast.

Feeding - Feeds on plankton and suspended organic particles drifting in the water column.

Scottish distribution - Populations exist in sea lochs on the west coast, notably Loch Long, Loch Fyne, Loch Sunart, Loch Hourn and Loch Duich. Recently recorded within the Inner Sound, off Mingulay and within the Sound of Sleat.

Wider distribution - Recorded in Kenmare River and Kilkieran Bay (Ireland). Also recorded in Scandinavia.

Feature status - Scottish populations of this beautiful anemone are of international and possibly global importance. The fireworks anemone is highly sensitive to mechanical damage from mobile fishing gear (damaging or completely removing the anemones from the sea bed) particularly trawling for *Nephrops*. Static gears (creel fishing) have a lesser impact but can also reduce anemone numbers in fished areas.

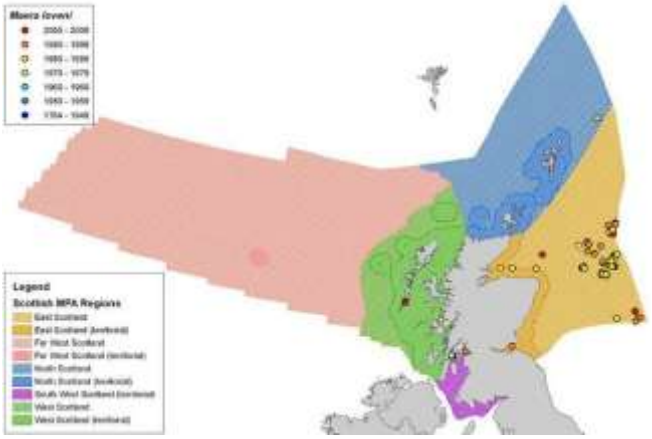
Natural heritage importance	Information sources
UK BAP	Encyclopedia of Marine Life MarLIN

Common name - *Scientific name*	Species group
MUD BURROWING AMPHIPOD - *MAERA LOVENI*	**Lobsters and sand hoppers**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Claude Nozeres

Distribution



Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2011

Feature description

Characteristics - A relative of sand hoppers, these amphipods have a characteristically long slender but flattened body, higher than it is wide, with numerous legs that vary in shape and size. They grow up to 2.5cm in length. Their heads are small and rounded, with inconspicuous eyes and a pair of very slender antennae that are almost as long as the body. Colour when in their natural habitat is unknown.

Habitat - Lives in burrows within subtidal muds at depths of 20-400m. This animal seems to be more active at night, rarely leaving its burrow during the day. Burrows are commonly interconnected with those of other crustaceans such as *Nephrops norvegicus.*

Feeding - This deposit feeder grazes on algae and detritus in the mud and sand.

Scottish distribution - A sparsely scattered distribution, primarily offshore, this cold water species reaches the southern limit of its range in Scottish waters.

Wider distribution - European coasts from Norway to the British Isles. Also recorded from the western North Atlantic, Arctic Ocean, Greenland and Iceland.

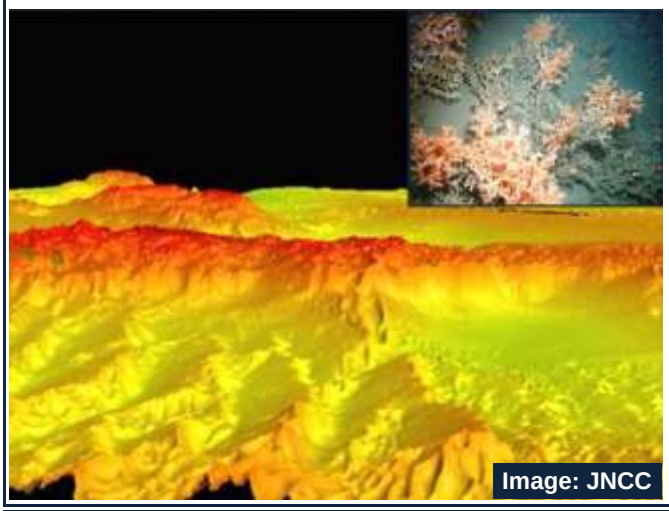
Feature status - A characteristic part of the burrowed mud community. They turn over the sediment, letting oxygen penetrate, improving the habitat for other organisms. This amphipod is probably an important food for other animals, including fish, but it is likely to be under recorded due to its small size and burrowing nature.

Natural heritage importance	Information sources
	World Biodiversity Database: Crustacea

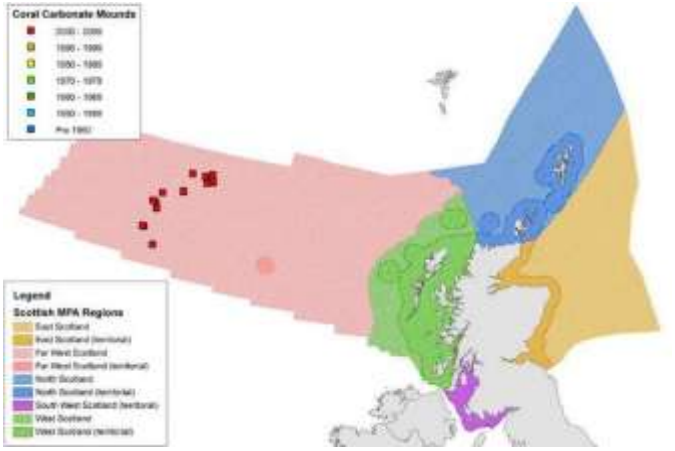
Broad habitat

CARBONATE MOUND COMMUNITIES

Image



Distribution



Feature description

Characteristics - Carbonate mounds are steep sided mounds of varying shape, which may be up to 350m high and 2km wide at their base. They often have a sediment veneer composed of carbonate sands, muds and silts and host diverse communities of deep-sea organisms, which include: cold water reef building corals (e.g. *Lophelia pertusa*); sponges; bryozoans; soft corals; sea squirts; tube worms; sea firs; feather stars; and bivalve molluscs.

Environmental preferences - Occur offshore in water depths of between 500 and 1100m.

Scottish distribution - Hatton Bank in the far west of Scottish waters supports the only verified records of carbonate mounds in Scotland, but work is ongoing to improve our knowledge of the distribution of this habitat.

Wider distribution - Widely distributed across the North Atlantic from the Iberian Peninsula to the offshore waters of Norway. There are notable examples in the Porcupine Seabight, Rockall Trough (Irish watersand the canyons located at the south-west tip of the UK continental shelf.

Feature status - Carbonate mounds provide a platform on which a diverse array of deep sea life can settle and thrive. Carbonate mound communities are particularly sensitive to demersal trawling operations.

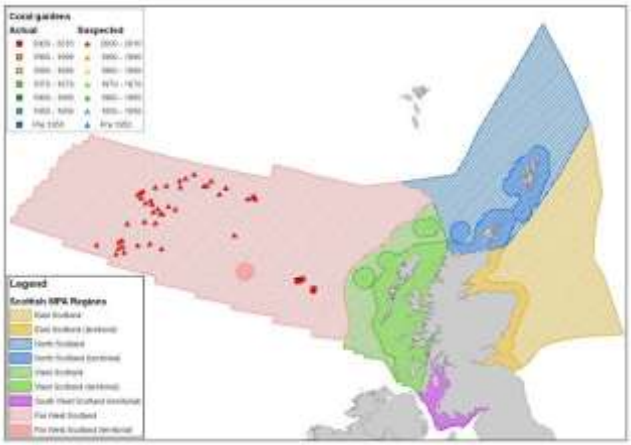
Natural heritage importance	Information sources
OSPAR T&D	OSPAR Case Report
Scottish Biodiversity List	Plymouth University Marine Institute
UK BAP	UK BAP Habitat Definitions

Component biotopes in Scottish waters

No component biotopes

Broad habitat

CORAL GARDENS

Image	Distribution
 Image: JNCC	

Feature description

Characteristics - Coral gardens are highly diverse habitats comprising dense aggregations of colonies or individuals of one or more coral species, which in some locations may reach densities of between 100 and 700 colonies per 100m^2. Where reef-forming corals do occur, they settle in scattered clumps or small colonies and do not dominate the habitat. Life typically harboured by coral garden communities includes basket stars, brittlestars, feather stars, molluscs, crustaceans and deep water fish species.

Environmental preferences - Occur in water temperatures of between 3 - 8ºC and at a range of depths; from 15m off the Portuguese coast to several thousand meters deep on the flanks of seamounts. Coral gardens can occur on both soft and hard substrates. Soft bottomed coral gardens tend to be dominated by solitary hard corals, sea pens and bamboo coral, whereas hard bottomed coral gardens tend to be dominated by gorgonians, hydrocorals and/or black coral. Coral gardens thrive in moderate to strong currents which prevents silt deposition on the hard substrate that most coral species need for attachment.

Scottish distribution - The only verified record of this habitat type is from the Anton Dohrn seamount. However, this habitat is thought to be present on Hatton Bank,George Bligh Bank and on other deep ocean rises to the far west of Scotland. Work is ongoing to improve our knowledge of the distribution of coral garden communities.

Wider distribution - Thought to be present to varying degrees across most regions of the north-east Atlantic.

Feature status - As a relatively new discovery, little is known about the status of coral gardens. It is thought, however, that like most coral communities coral gardens may be threatened by demersal trawling operations and the effects of smothering.

Natural heritage importance	Information sources
OSPAR T&D	OSPAR Background Document OSPAR Case Report Plymouth University Marine Institute

Component biotopes in Scottish waters

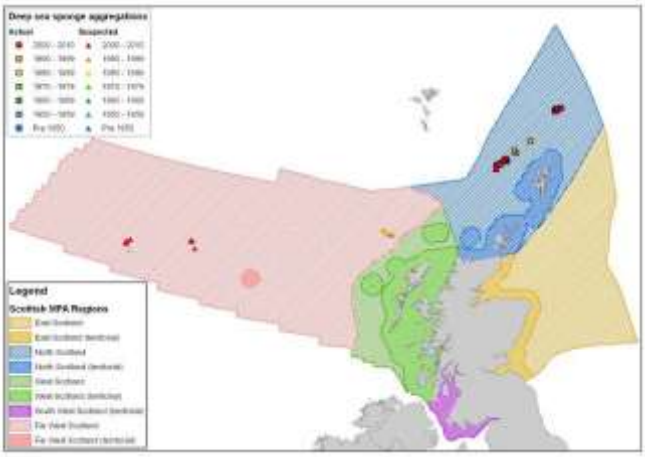
No component biotopes

Broad habitat

DEEP SEA SPONGE AGGREGATIONS

Image

Distribution



Feature description

Characteristics - Deep sea sponge aggregations are principally composed of sponges from two classes: the glass sponge (Hexactinellida) and the giant sponge (Demospongia). They support diverse biological communities, with the sponges increasing habitat complexity and influencing the occurrence of other species. They provide shelter for a huge range of tiny animals seeking protection and an elevated perch for filter feeding animals such as brittle stars. The dense spicule mats associated with sponge communities are thought to support a rich community of species.

Environmental preferences - Deep sea sponge aggregations occur offshore in water depths of between 250 and 1300m, in temperatures of between <0 -10°C and in moderate currents of ~0.5 knots. They are found on soft sediments and harder mixed substrates (such as boulders or cobbles).

Scottish distribution - Dense aggregations of giant and glass sponges are present in the Faroe-Shetland Channel to the west and north of Shetland in the mid and northern reaches of the shelf break where they are referred to as “Ostebund” or “cheese-bottoms” by local fishermen due to their appearance. Fields of the glass sponge *Pheronema carpenteri* are also suspected from the Hatton-Rockall Basin. .

Wider distribution - Dense aggregations of deep sea sponges are known to occur in various locations across the NE Atlantic, with notable examples in the waters surrounding the Faeroe Islands, Norway and in the Porcupine Seabight.

Feature status - Current understanding suggests that the sponges are slow growing, taking several decades to reach full size. Deep sea sponge aggregations and the biodiversity they support are therefore likely to take many years to recover if adversely affected. Physical disturbance to the seabed is the greatest threat, and it is probable that demersal trawling operations and increased turbidity may damage these communities. They may also be sensitive to pollutants such as those arising from oil and gas operations. ‘Bio-prospecting’ (the search for novel chemical compounds for commercial application) could also present a threat to deep sea sponge aggregations in the future.

Natural heritage importance

OSPAR T&D
UK BAP

Information sources

OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

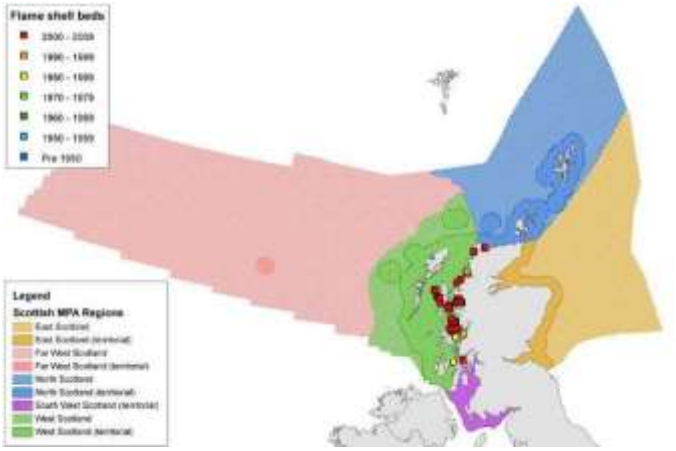
Component biotopes in Scottish waters

No component biotopes, although Scotland is thought to host two ecologically distinct growth forms - Boreal ‘Ostur’ (the dense occurrence of giant and glass sponges in the Faeroe-Shetland Channel) and fields of the glass sponge *Pheronema carpenteri.*

Broad habitat

FLAME SHELL BEDS

Image	Distribution



Feature description

Characteristics - The flame or gaping file shell *Limaria hians* creates nests by weaving together tough threads (byssus) with surrounding material such as seaweed, maerl and shells. Adjoining nests coalesce to form larger structures with multiple flame shells which, in some locations where conditions allow, carpet the bed for several hectares. The carpets create a unique habitat that stabilises the sediment and provides an attachment surface for many organisms including hydroids, bryozoans, ascidians and seaweeds. These organisms in turn add to the habitat complexity and provide shelter for other species such as cod and saithe. A rich diversity of fauna is also found within and below the flame shell bed.

Environmental preferences - Occurs on mixed muddy, sand and gravel bottoms at depths of 5-100m in sheltered areas of moderate to strong currents. They are often found in tide-swept narrows such as the entrances or sills of sea lochs.

Scottish distribution - Found on the west coast of Scotland the most extensive beds are thought to occur in Loch Sunart. In the Creag Gobhainn area of Loch Fyne, flame shell reefs have been reported to reach 10-20cm high, supporting >700 individuals/m² and covering several hectares of the seabed.

Wider distribution - Recorded flame shell distribution is patchy; extending from the Mediterranean to the Canary Islands, up to the Lofoten Islands in Norway. A single record of this habitat exists from Mulroy Bay on the north-west coast of Ireland.

Feature status - Considered scarce in the UK, the Scottish beds are of national importance. The large beds once found in the Firth of Clyde have declined since the 1970s and current evidence suggests that this habitat may once have been much more widespread. The beds are prone to anthropogenic impacts and especially susceptible to demersal fishing, recent evidence suggesting they may take more than 100 years to re-establish following a single dredging event.

Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	JNCC Marine Habitat Classification MarLIN UK BAP Habitat Definitions

Component biotopes in Scottish waters

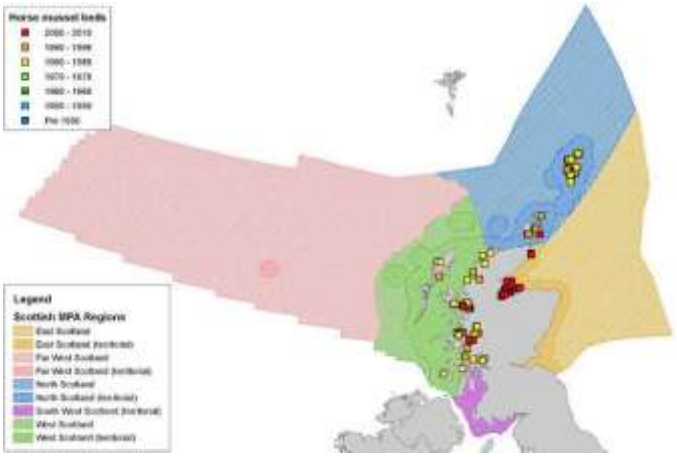
Limaria hians beds in tide-swept sublittoral muddy mixed sediment - **SS.SMx.IMx.Lim** (v04.05), SS.IMX.FaMx.Lim (v97.06), A5.434 (EUNIS).

Broad habitat

HORSE MUSSEL BEDS

Image

Distribution



Feature description

Characteristics - The horse mussel *Modiolus modiolus* forms scattered clumps, thin layers or dense raised beds several metres in height and length. Raised beds are formed of horse mussels, bound together by a matrix of byssus threads which accumulate a sediment of silt, organically rich faeces and shells, further increasing the bed height. They significantly modify sedimentary habitats and provide hard substratum, refuge and ecological niches for a wide variety of organisms.

Environmental preferences - Weak to strong water movement on a variety of mixed substrata. Found at depths of 5-220m.

Scottish distribution - Recorded in sea lochs and embayments in Shetland, Orkney and down the west coast with scattered records from the Outer Hebrides. Relatively small, dense beds of horse mussels can also occur on steep rocky surfaces within sea lochs.

Wider distribution - Recorded from the Ards Peninsula, Strangford Lough, off both ends of the Isle of Man, off north-west Anglesey and north of the Lleyn Peninsula, Wales.

Feature status - Scottish waters support 85% of all horse mussel beds in the British Isles which themselves support most of the habitat within Europe. The beds increase local biodiversity and are settling grounds for commercially important bivalves, such as scallops. However, they are particularly sensitive to physical disturbance and mobile fishing gears may damage and/or remove beds. The habitat has declined since the 1950s with formerly extensive beds in Strangford Lough (N. Ireland) lost as recently as 2007 due to scallop trawling and dredging. The condition of beds in Loch Creran and Loch Duich on the west coast of Scotland has also deteriorated but the cause is currently unknown.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

MarLIN
OSPAR Case Report
UK BAP Habitat Definitions
UK MarineSACs Overview

Component biotopes in Scottish waters

Modiolus modiolus beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata - **SS.SBR.SMus.ModT** (v.04.05), MCR.ModT (v.97.06), A5.621 (EUNIS). *Modiolus modiolus* beds on open coast circalittoral mixed sediment - **SS.SBR.SMus.ModMx** (v.04.05), CMX.ModMx (v.97.06), A5.622 (EUNIS). *Modiolus modiolus* beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata - **SS.SBR.SMus.ModHAs** (v04.05), SCR.Mod.ModHAs (v97.06), A5.623 (EUNIS). *Modiolus modiolus* beds with *Chlamys varia*, sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata - **SS.SBR.SMus.ModCvar** (v04.05), SCR.Mod.ModCvar (v97.06), A5.624 (EUNIS).

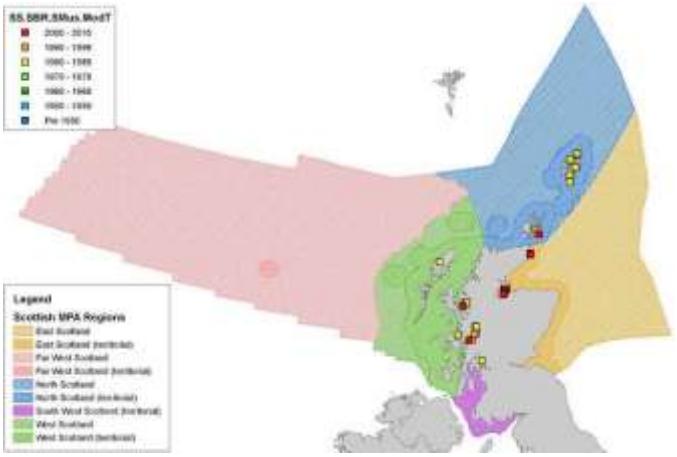
Component biotope name

***MODIOLUS MODIOLUS* BEDS WITH HYDROIDS AND RED SEAWEEDS ON TIDE-SWEPT CIRCALITTORAL MIXED SUBSTRATA (SS.SBR.SMUS.MODT)**

Image

Image: Keith Hiscock / JNCC

Distribution



Feature description

Characteristics - In strong currents or tide-swept conditions, the horse mussel (*Modiolus modiolus*) forms raised beds on mixed muddy substrates. The beds are made up of living and dead mussels, bound together with byssus threads, and an accumulation of silt and mussel faeces. In some cases they can be several metres high and many metres long providing refuge for a variety of other organisms. Red seaweeds and sea firs grow on or amongst the horse mussels. Brittlestars are often common in this habitat, along with tube worms, whelks, clams and sea anemones.

Environmental preferences - Typically found on the open coast but also in the tide-swept channels of marine inlets on mixed, muddy substrata (cobbles and pebbles) from 5-50m.

Scottish distribution - Recorded from Shetland (e.g. Basta Voe and Yell Sound), Orkney (Shapinsay Sound), the Outer Hebrides (Loch Roag) and within sea lochs of the west coast of Scotland (e.g. Loch Carron, Loch Linnhe and Loch Long).

Wider distribution - There are very few records of this biotope outside of Scotland but it has been recorded off the north-west Lleyn Peninsula (North Wales) and off Co. Down (Northern Ireland).

Feature status - Support 85% of the horse mussel beds in the British Isles, Scottish waters represent a nationally important refuge for this habitat which is particularly sensitive to physical disturbance. Mobile fishing gears may damage or completely remove horse mussel beds.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

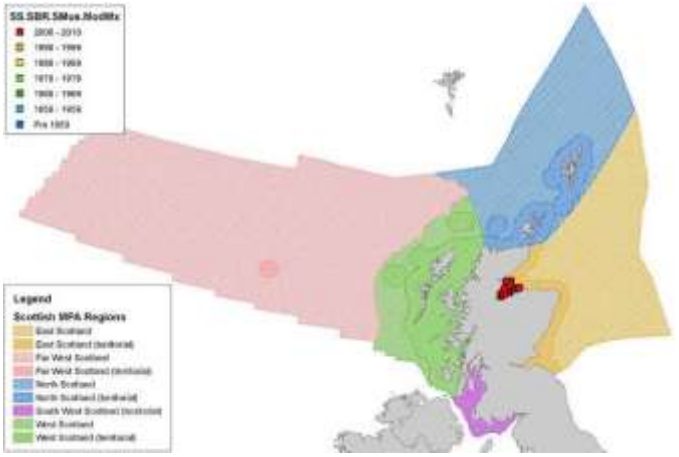
Component biotope name

***MODIOLUS MODIOLUS* BEDS ON OPEN COAST CIRCALITTORAL MIXED SEDIMENT (SS.SBR.SMUS.MODMX)**

Image

Image: Marine Scotland Science

Distribution



Feature description

Characteristics - Beds of horse mussels (*Modiolus modiolus*) on or within mixed muddy and gravel sediments in deep water. Clumps of live and dead shells are bound together by the byssal threads providing a stabilising effect on the seabed. The accumulation of silt and mussel faeces upon and around the beds provides a habitat that attracts a rich diversity of organisms, in particular polychaete worms. Venerid bivalves and brittlestars are also commonly recorded.

Environmental preferences - Typically occurs on current swept, reasonably sheltered circalittoral mixed sediment (muddy sand and gravel, with shells and stones) at depths of 40-100m.

Scottish distribution - Records in Sullom Voe, Shetland and Hoy Sound, Orkney constitute the only known Scottish locations for this biotope.

Wider distribution - There are a number of records in the Irish Sea, with scattered records on the east coast of Ireland, Northern Ireland and England. Records of *M. modiolus* off Norway, in the Kattegat Sea and off the west coast of France may represent examples of this biotope.

Feature status - *M. modiolus* is a long lived species with poor recruitment. Horse mussel beds are particularly sensitive to physical disturbance which can adversely affect bed integrity. Mobile fishing gears may damage or completely remove beds.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

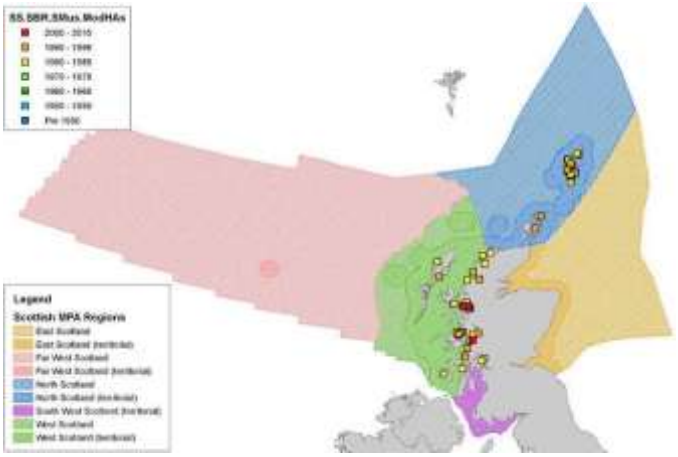
Component biotope name

***MODIOLUS MODIOLUS* BEDS WITH FINE HYDROIDS AND LARGE SOLITARY ASCIDIANS ON VERY SHELTERED CIRCALITTORAL MIXED SUBSTRATA (SS.SBR.SMUS.MODHAS)**

Image

Image: Sue Scott / JNCC

Distribution



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Feature description

Characteristics - In wave sheltered areas, the horse mussel (*Modiolus modiolus*) forms beds or scattered clumps on mixed muddy substrates. The beds or clumps consist of living and dead mussels bound together by byssus threads. They provide refuges and substratum for sea firs, solitary sea squirts and fish species. The beds also support a variety of brittlestars, together with commercially important shellfish (e.g. queen scallops), hermit crabs, spider crabs and whelks.

Environmental preferences - This biotope typically forms on mixed, muddy substrata (cobbles and pebbles) in sheltered conditions with slight tidal movement at depths of 5-30m.

Scottish distribution - Found in sea lochs and voes in Shetland (e.g. Sullom Voe), Orkney (e.g. North Sanday and Shapinsay Sound), the Outer Hebrides (e.g. Loch Roag and Loch Tarbert) and the west coast (e.g. Loch Sunart and Loch Duich).

Wider distribution - This biotope is only recorded in Scotland.

Feature status - This biotope is unique to Scottish waters and, like the other horse mussel bed biotopes, is particularly sensitive to physical disturbance which can adversely affect bed integrity. Mobile fishing gears may damage or completely remove *M. modiolus* beds.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

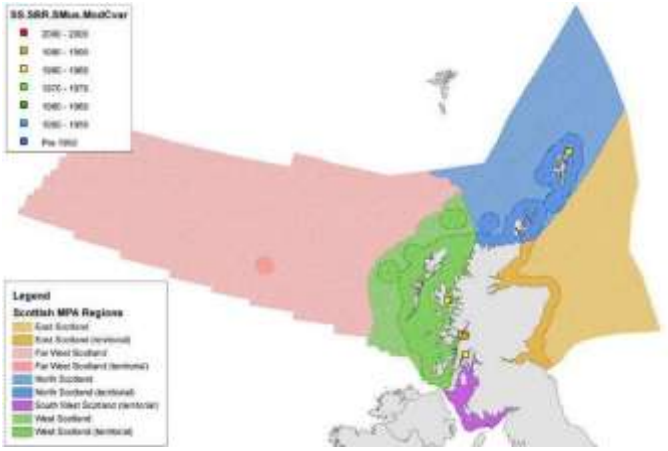
Component biotope name

***MODIOLUS MODIOLUS* BEDS WITH *CHLAMYS VARIA*, SPONGES, HYDROIDS AND BRYOZOANS ON SLIGHTLY TIDE-SWEPT VERY SHELTERED CIRCALITTORAL MIXED SUBSTRATA (SS.SBR.SMUS.MODCVAR)**

Image

Image: Marine Scotland Science

Distribution



Feature description

Characteristics - Beds of horse mussels (*Modiolus modiolus*) on or in gravelly mud sediments. Beds are made up of living and dead mussels, bound together with byssus threads, and an accumulation of silt and mussel faeces. The beds provide refuge and substratum for a variety of other organisms. The variable scallop (*Chlamys varia*) is frequently found amongst the horse mussels. Brittlestars, feather stars, hermit crabs, spider crabs and whelks are also found in this biotope. Sponges, sea firs, sea mats and sea squirts grow on the mussels.

Environmental preferences - This biotope forms beds on slightly tide-swept, very sheltered circalittoral mixed sediment (pebbles and shells on sandy mud) at depths of 5-220m.

Scottish distribution - Restricted to a small number of sea lochs on the west coast (Loch Fyne, Loch Creran and on Skye), and within Bluemull Sound in Shetland. An atypical deep water variant of this biotope has recently been recorded within the Sound of Canna.

Wider distribution - There are only a few records of this biotope outside of Scottish waters, these are primarily in the Irish Sea (Northern Ireland and north-west Wales).

Feature status - This is the rarest of the horse mussel bed biotopes and like all biogenic reefs is particularly sensitive to physical disturbance which can adversely affect bed integrity. Mobile fishing gears may damage or completely remove *M. modiolus* beds.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

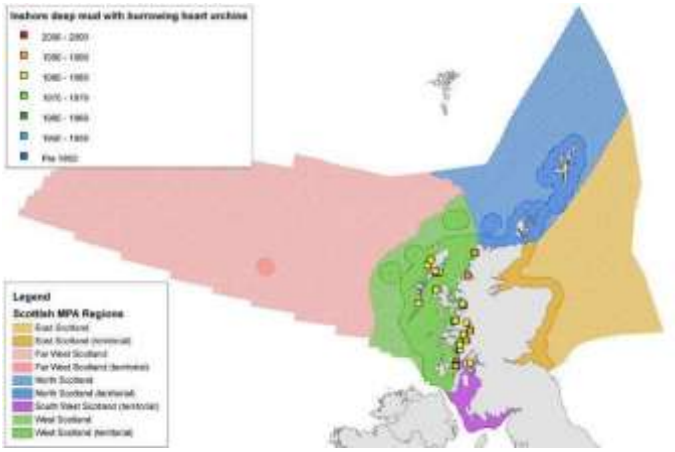
JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

Broad habitat

INSHORE DEEP MUD WITH BURROWING HEART URCHINS

Image	Distribution
 Image: Bernard Picton	 Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2011

Feature description

Characteristics - The silty muddy basins of sea lochs and other stable deep waters support this community which is dominated by the heart urchin *Brissopsis lyrifera,* and the brittlestar *Amphiura chiajei*. The habitat supports several species of burrowing bivalves, polychaete worms and may also contain *Nephrops* and low numbers of sea pens.

Environmental preferences - Occurs in the moderately exposed to very sheltered conditions of marine inlets and sea lochs at depths of 20-100m.

Scottish distribution - Scattered records from sea lochs on the west coast (e.g. Loch Duich and Loch Linnhe) and the Outer Hebrides (e.g. Loch Seaforth).

Wider distribution - Records of this habitat are mostly limited to Scotland; however, it has been recorded in Strangford Lough, Northern Ireland. It is possible that this biotope is more extensive due to the wide distribution of the burrowing heart urchin in North Sea sediments.

Feature status - The main pressure on this habitat is demersal trawling for commercially important species (e.g. *Nephrops*), which may result in direct physical damage and the removal of sensitive species such as the heart urchin and sea pens with an overall decline in species abundance and diversity.

Natural heritage importance	Information sources
UK BAP	JNCC Marine Habitat Classification MarLIN UK BAP Habitat Definitions

Component biotopes in Scottish waters

Brissopsis lyrifera and *Amphiura chiajei* in circalittoral mud - **SS.SMu.CFiMu.BlyrAchi** (v04.05), CMU.BriAchi (v97.06), A5.363 (EUNIS).

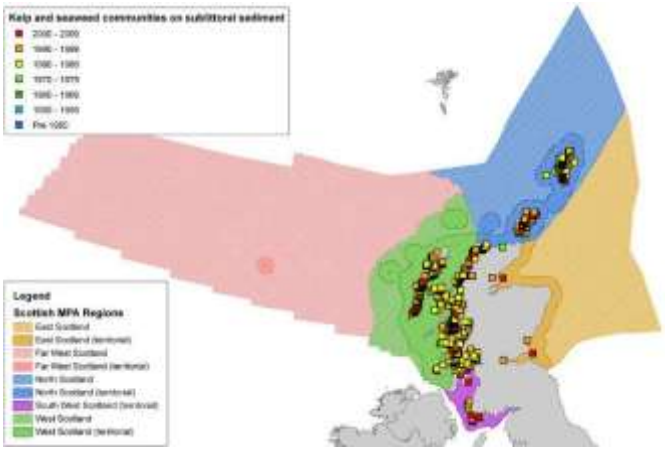
Broad habitat

KELP AND SEAWEED COMMUNITIES ON SUBLITTORAL SEDIMENT

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Shallow sublittoral sediments which support seaweed communities typically include the sugar kelp *Saccharina latissima*, the bootlace weed *Chorda filum* and various red and brown seaweeds, particularly filamentous types. With increasing shelter from wave action, some communities develop as loose-lying mats on the sediment surface. A diverse array of animals are associated with these kelps and seaweeds e.g. burrowing polychaete worms and bivalves, scavenging hermit crabs, crabs, starfish, fish and grazing top shells.

Environmental preferences - Only found in shallow water (max. 20m), on a wide variety of substrates (muddy sands and gravels through to cobbles and boulders) that reflect prevalent environmental conditions.

Scottish distribution - Particularly widespread along the west coast of Scotland and in sheltered areas of Orkney and Shetland, with occasional records on the east coast.

Wider distribution - Although predominantly recorded in Scotland, this habitat is also found around the coast of the British Isles, particularly in the south and west.

Feature status - This diverse habitat is sensitive to substratum loss, changes in water flow or wave exposure and deoxygenation. Pressures on this habitat include climate change, coastal development and bottom trawling.

Natural heritage importance

Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Component biotopes in Scottish waters

Selected component biotopes of Kelp and seaweed communities on sublittoral sediment - **SS.SMp.KSwSS** (v04.05), IMX.KSwMx (v97.06), A5.52 (EUNIS). Includes: *Laminaria saccharina* [*Saccharina latissima*] and red seaweeds on infralittoral sediments - **SS.SMp.KSwSS.LsacR** (v04.05), A5.521 (EUNIS); *Laminaria saccharina* and *Chorda filum* on sheltered upper infralittoral muddy sediment - **SS.SMp.KSwSS.LsacCho** (v04.05), A5.522 (EUNIS); *Laminaria saccharina* with *Psammechinus miliaris* and/or *Modiolus modiolus* on variable salinity infralittoral sediment - **SS.SMp.KSwSS.LsacMxVS** (v04.05) A5.523 (EUNIS); *Laminaria saccharina*, *Gracilaria gracilis* and brown seaweeds on full salinity infralittoral sediment - **SS.SMp.KSwSS.LsacGraFS** (v04.05), A5.524 (EUNIS); *Laminaria saccharina* and *Gracilaria gracilis* with sponges and ascidians on variable salinity infralittoral sediment - **SS.SMp.KSwSS.LsacGraVS** (v04.05), A5.525 (EUNIS); & Loose-lying mats of *Phyllophora crispa* on infralittoral muddy sediment - **SS.SMp.KSwSS.Pcri** (v04.05), A5.527 (EUNIS).

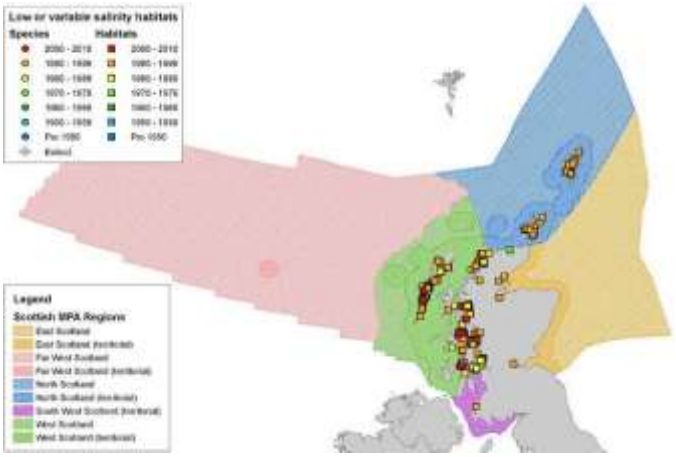
Broad habitat

LOW OR VARIABLE SALINITY HABITATS

Image

Image: Stewart Angus

Distribution



Feature description

Characteristics - Low or variable salinity habitats occur where seawater and fresh water meet and mix to varying degrees. The salinity may vary from full to low with the tide, with fresh water input from rivers or intermittent fresh water input from rainfall and runoff. In coastal saline lagoons, a proportion of the seawater is retained at low tide and the lagoon and may become brackish, fully saline or (rarely) hypersaline. Communities tend to be less diverse than either fully marine or fresh water habitats but are dominated by tolerant or specialist species. Specialist species include sea anemones, snails, bivalves and stoneworts; some of which are very rare and restricted to saline lagoons or variable salinity habitats.

Environmental preferences - Commonly found in estuaries, these habitats also occur at the heads of sea lochs and inlets subject to fresh water runoff, or in saline lagoons.

Scottish distribution - Widespread on the west coast, the Outer Hebrides, Orkney and Shetland, with comparatively few records from the east coast.

Wider distribution - Low or reduced salinity habitats occur throughout the UK, especially in estuaries and coastal waters subject to fresh water runoff. In England, concentrations of lagoons in the east and south coincide with the prevalence of low lying land close to estuaries.

Feature status - Scotland's varied coastline supports a significant proportion of these habitats in a UK context. Threats include activities that change the water flow and the salinity regime (e.g. coastal development, land claim, water abstraction etc.). They are also susceptible to sea level rise and pollution. Saline lagoons are fragile and rare habitats in their own right; susceptible to extreme weather evens (storms) which can eradicate small lagoons formed by sediment barriers.

Natural heritage importance

EC Habitats Directive Annex I (Lagoons)
Scottish Biodiversity List
UK BAP

Information sources

SNH Scottish Lagoons
UK BAP Habitat Definitions

Component biotopes and species in Scottish waters

Biotopes - Faunal communities on variable or reduced salinity infralittoral rock - **IR.LIR.IFaVS** (v04.05), SIR.EstFa (v97.06), A3.36 (EUNIS). Kelp in variable or reduced salinity - **IR.LIR.KVS** (v04.05), IR.SIR.K (v97.06), A3.32 (EUNIS).

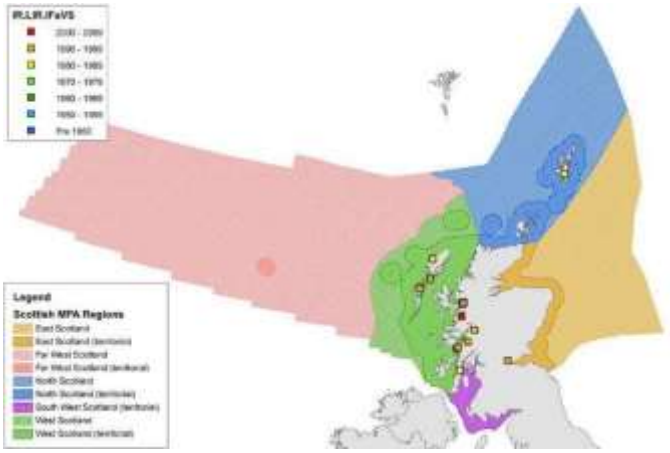
Component biotope name

FAUNAL COMMUNITIES ON VARIABLE OR REDUCED SALINITY INFRALITTORAL ROCK (IR.LIR.IFAVS)

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Animal dominated communities develop on vertical surfaces and overhangs in variable or low salinity conditions. In Scotland, this habitat is characterised by a bed of dense blue mussels in the tide-swept channels of sea lochs and vertical rock surfaces within saline lagoons. The mussel bed supports barnacles, sea firs, and sea mats. Large kelps may occur in some cases. Brittlestars and roaming starfish predators occur where salinity is not too low.

Environmental preferences - Occurs in very sheltered sea lochs with varied salinity, in tide swept channels or on sheltered subtidal rock (often vertical) in saline lagoons.

Scottish distribution - There are only a few records of this habitat in Scottish waters. These are centred on the west coast (e.g. Firth of Lorn, Loch Long and Loch Nevis) and the Outer Hebrides (e.g. Ardvey Tidal Pond, Loch Ceann Hulabhaig, Lewis). There are single records from the Firth of Forth on the east coast and in Shetland (Stromness Voe).

Wider distribution - There are a few records of this habitat (and two related biotopes) in south-west England.

Feature status - The majority of UK records of this habitat occur in Scotland as the biotope **MytRS**. Pressures on this habitat include activities that change the water flow and the salinity regime (e.g. coastal development, land claim, water abstraction etc.). They are also susceptible to sea level rise and pollution. The mussel beds themselves may be damaged by physical disturbance.

Natural heritage importance

EC Habitats Directive Annex I (Reefs & Lagoons)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

Mytilus edulis beds on reduced salinity infralittoral rock - **IR.LIR.IFaVS.MytRS** (v04.05), IR.SIR.EstFa.MytT (v97.06), A3.361 (EUNIS).

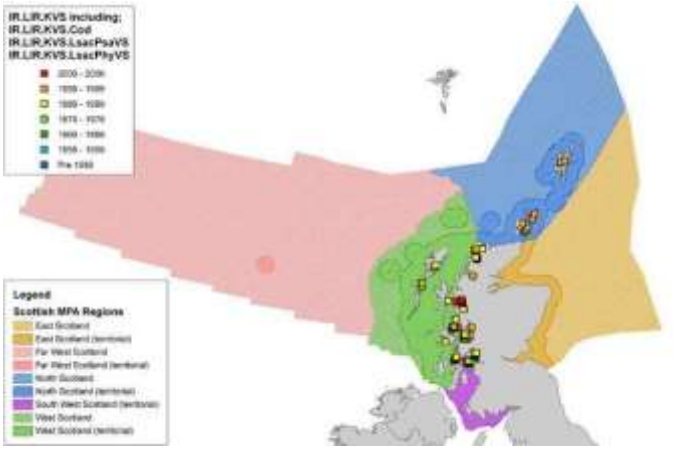
Component biotope name

KELP IN VARIABLE OR REDUCED SALINITY (IR.LIR.KVS)

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - This habitat is dominated by sugar kelp, with red and green seaweeds, and encrusting coralline algae growing on cobbles, boulders and bedrock. The seaweeds provide shelter and food for a variety of animals. The associated animal community may comprise of grazing urchins and gastropods, tube-dwelling polychaete worms, sea squirts, barnacles, starfish and brittlestars. Crabs and bivalves may also be present. The component biotopes differ in the relative abundance of seaweeds and sea squirts.

Environmental preferences - Very wave sheltered bedrock, cobbles and boulders subject to weak tidal streams in the shallow subtidal, in areas of varied salinity at 0-10m; such as sheltered voes in Shetland, in saline lagoons and at the head of fiardic sea lochs.

Scottish distribution - Found in Shetland, Orkney, the Hebrides and the west coast of Scotland. **KVS.Cod** is mainly found in voes of Orkney, Shetland and Scottish lagoons, while **KVS.LsacPsaVS** is restricted to the west coast. **KVS.LsacPhyVs** is restricted to Lochs Sunart, Etive and Leven on the west coast and North Uist in the Outer Hebrides.

Wider distribution - There are very few records of this biotope and its components outside of Scotland.

Feature status - Pressures on these habitats include activities that change the water flow and the salinity regime (e.g. coastal development, land claim, water abstraction etc.). They are susceptible to sea level rise and pollution.

Natural heritage importance

EC Habitats Directive Annex I (Reefs & Lagoons)
Scottish Biodiversity List

Information sources

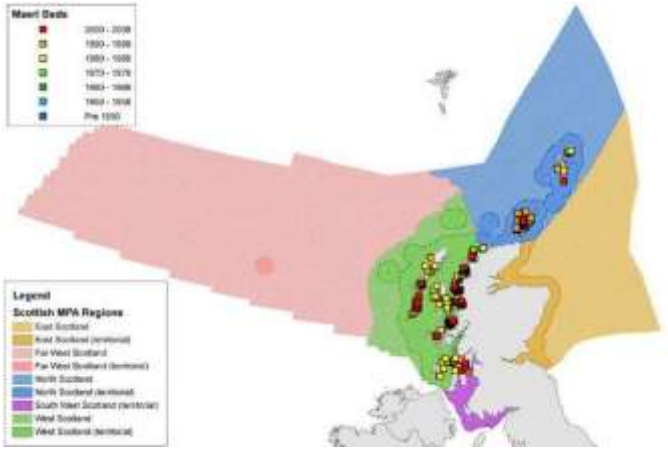
JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

Codium spp. with red seaweeds and sparse *Laminaria saccharina* on shallow, heavily-silted, very sheltered infralittoral rock - **IR.LIR.KVS.Cod** (v04.05), SIR.Lsac.CodR (v96.7), A3.321 (EUNIS).
Laminaria saccharina and *Psammechinus miliaris* on variable salinity grazed infralittoral rock - **IR.LIR.KVS.LsacPsaVS** (v04.05), SIR.LsacRS.Psa (v97.06), A3.322 (EUNIS).
Laminaria saccharina with *Phyllophora* spp. and filamentous green seaweeds on variable or reduced salinity infralittoral rock - **IR.LIR.KVS.LsacPhyVS** (v04.05), SIR.LsacRS.Phy (v97.06), A3.323 (EUNIS).

Broad habitat

MAERL BEDS

Image	Distribution
 Image: Paul Naylor	 Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2011

Feature description

Characteristics - An unusual red seaweed with a hard chalky skeleton that grows as small rounded nodules or short branched twig-like shapes. In high abundance, maerl can form loosely interlocking beds through which water is able to circulate, providing the perfect conditions for the development of diverse communities of plants and animals (on, within or under the beds). Red seaweeds, sea firs, sea urchins, brittlestars, starfish, sea anemones and scallops may colonise the surface. Maerl needs light to grow, so living maerl is restricted to the surface of the beds overlying the chalky skeletons of dead maerl. Three maerl species exist in the British Isles and the relative composition of these within a bed, and the proportion of living / dead maerl within and between beds, varies with factors such as salinity and wave exposure. Maerls are extremely slow growing and extensive beds may be over 1000 years old.

Environmental preferences - Coarse clean sands and gravels either on the open coast or in tide-swept channels to a depth of about 20m. Occasional records from muddier sediments e.g. Loch Torridon.

Scottish distribution - Widespread on the west coast (e.g. Arran, Loch Sween, Sound of Arisaig and Loch Laxford), the Outer Hebrides (e.g. Sound of Barra and Loch nam Madadh) and in tide-swept areas of Orkney (e.g. Wyre and Hoy Sound) and Shetland (e.g. Bluemull Sound).

Wider distribution - Recorded on the south English coast, in Wales, Ireland and Northern Ireland, NW Iceland, NW France, NW Spain and the Canaries. Also known to occur in Sweden and Norway.

Feature status - Scotland has approximately 30% of the maerl beds in north-west Europe and most of the beds in the UK. They are highly sensitive to physical disturbance, smothering, increased suspended sediment and changes in water flow. Pressures are known to include mobile demersal fishing activity, aquaculture, pollution and extraction (for soil conditioner).

Natural heritage importance	Information sources
EC Habitats Directive Annex I (Sandbanks)	JNCC Marine Habitat Classification
OSPAR T&D	OSPAR Case Report
Scottish Biodiversity List	UK BAP Habitat Definitions
UK BAP	UK MarineSACs Overview

Component biotopes in Scottish waters

Maerl beds - **SS.SMp.Mrl** (v04.05), IGS.Mrl (v97.06), A5.51 (EUNIS). Includes: *Phymatolithon calcareum* maerl beds in infralittoral clean gravel or coarse sand - **SS.SMp.Mrl.Pcal** (v04.05), A5.511 (EUNIS), including **Pcal.R** (v04.05), A5.5111 (EUNIS); and **Pcal.Nmix** (v04.05), A5.5112 (EUNIS); *Lithothamnion glaciale* maerl beds in tide-swept variable salinity infralittoral gravel - **SS.SMp.Mrl.Lgla** (v04.05), A5.512 (EUNIS); & *Lithothamnion corallioides* maerl beds on infralittoral muddy gravel - **SS.SMp.Mrl.Lcor** (v04.05), A5.513 (EUNIS).

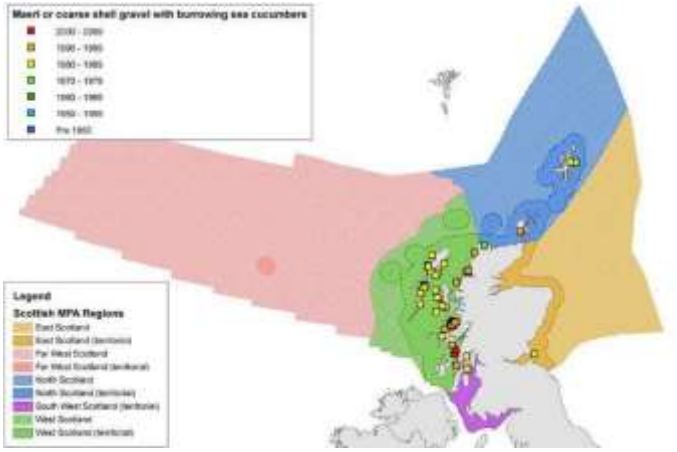
Broad habitat

MAERL OR COARSE SHELL GRAVEL WITH BURROWING SEA CUCUMBERS

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Gravel, maerl gravel (dead maerl) or coarse sands with high densities of the gravel sea cucumber, *Neopentadactyla mixta*. Scallops, brittlestars, crabs and dragonets live on the surface of the sediment (some seaweeds may also be present) with widespread species such as tube dwelling sea anemones, sand mason worms and parchment worms living within the coarse substrates. This biotope may occur adjacent to maerl beds. During winter months, gravel sea cucumbers bury deep in the sediment and become dormant.

Environmental preferences - Found in sublittoral clean, gravel, maerl gravel (dead maerl) and / or coarse sands in moderately wave-exposed, fully saline conditions at 10-50m.

Scottish distribution - Found primarily along the west coast and the Outer Hebrides, with occasional records from Orkney (Scapa Flow), Shetland (Lunna Ness and Out Skerries) and the Isle of May (outer Firth of Forth).

Wider distribution - This habitat is not recorded outside of the British Isles. The gravel sea cucumber itself has a wider recorded distribution, from northern Norway to the Bay of Biscay.

Feature status - This unique habitat is highly sensitive to physical disturbance and pressures are known to include mobile demersal fishing (including scallop dredging) and the extraction of maerl (for soil conditioner).

Natural heritage importance

EC Habitats Directive Annex I (Sandbanks)
Scottish Biodiversity List

Information sources

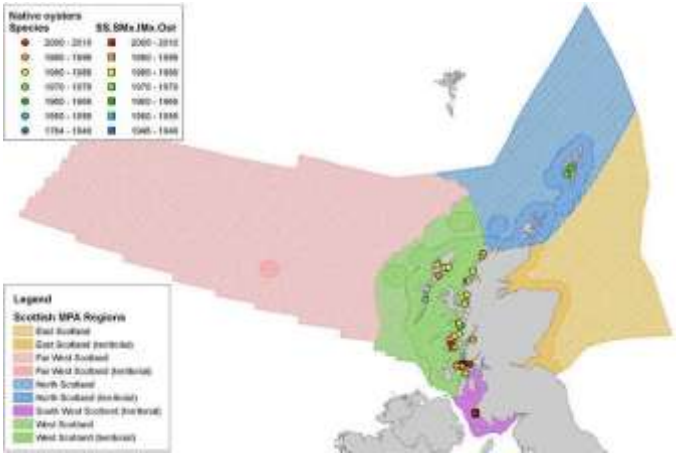
JNCC Marine Habitat Classification
MarLIN

Component biotopes in Scottish waters

Neopentadactyla mixta in circalittoral shell gravel or coarse sand - **SS.SCS.CCS.Nmix** (v04.05), CGS.NeoBv (v96.7), A5.134 (EUNIS).

Broad habitat

NATIVE OYSTERS

Image	Distribution
 Image: Graham Saunders / SNH	 Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2011

Feature description

Characteristics - This once widespread habitat is comprised of dense beds of the native oyster *Ostrea edulis* (at densities of 5 or more per m^2). A diverse community or organisms live on, amongst, or in the sediment beneath the bed. Dead oyster shells, which may make up a large proportion of the substratum, support sea squirts, sponges, hydroids and a turf of algae. Large polychaete worms are often present, along with predatory fish, starfish and crabs.

Environmental preferences - Associated with productive estuarine and shallow coastal water habitats on firm mud, muddy sand and muddy gravel with shells and stones. The oyster larvae settle on hard substrates. Sheltered coasts from the intertidal to 5m and occasionally to 20m.

Scottish distribution - Oyster beds are now recorded from only a few locations on the west coast of Scotland, namely Loch Ryan, Loch Sween and Loch Scridain.

Wider distribution - Confirmed sparse distribution around Ireland, western and southern England and Wales and northern France. *O. edulis* beds also occur or occurred in Norway, Denmark, Germany, Belgium, the Netherlands, and Spain.

Feature status - The native oyster has been a popular food in the UK for centuries and dense beds were once common along the coast of Scotland, including Orkney and Shetland. However, overfishing in the late 1800s and early 1900s, together with pollution, disease, pests and the introduction of non-native species, resulted in significant declines. Beds in the Firth of Forth covering 129km^2 landed 59 million oysters in 1834-36, but by 1957 they were extinct. Beds have been cultivated in some areas (on a relatively small scale). The only active oyster fishery left in Scottish waters is in Loch Ryan, which appears to have a large (estimates of over 5 million adults), self-sustaining population. There is evidence of unlawful gathering of oysters on a wide scale having a severe impact on small populations.

Natural heritage importance	Information sources
OSPAR T&D Scottish Biodiversity List UK BAP	JNCC Marine Habitat Classification MarLIN OSPAR Case Report SNH - native oyster leaflet UK BAP Habitat Definitions

Component biotopes and species in Scottish waters

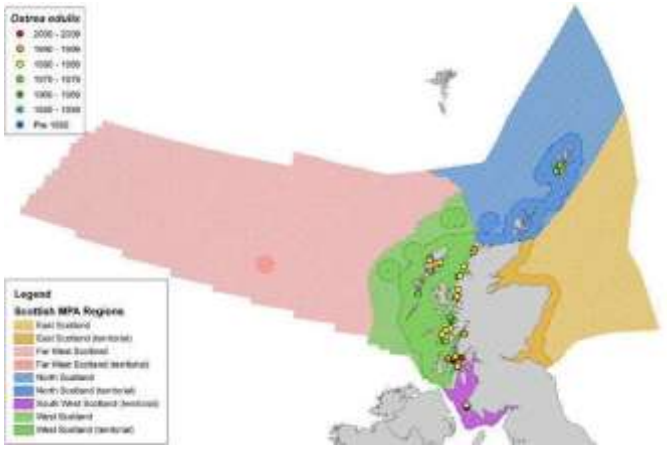
Biotope - *Ostrea edulis* beds on shallow sublittoral muddy mixed sediment - **SS.SMx.Imx.Ost** (v.04.05), Imx.Ost (v.97.06), A5.435 (EUNIS).
Species - Native oyster *Ostrea edulis*.

Common name - *Scientific name*	Species group
NATIVE OYSTER - *OSTREA EDULIS*	**Snails, clams, mussels and oysters**
Other name(s) - flat oyster, European oyster	***Recent synonym*** - none

Image

Image: Graham Saunders / SNH

Distribution



Feature description

Characteristics - The native oyster *Ostrea edulis* has an oval or pear-shaped shell up to 11cm long. The two halves (valves) of the shell are different shapes. The bottom (or left) shell is concave, while the top (or right) is flat. The shell is off-white, yellowish or cream in colour with light brown or bluish concentric bands and a rough, scaly surface. If opened the inner surfaces are pearly, white or bluish-grey, with darker blue areas. *O. edulis* typically lives for 6-10 years, although it can exceed 15 years.

Habitat - Associated with firm mud, muddy sand and muddy gravel with shells and stones, in estuarine and shallow coastal water habitats down to 80m, although more common above 20m.

Feeding - Oysters filter feed on suspended organic particles and plankton.

Scottish distribution - Usually found at low population densities fringing sea lochs along the west coast (e.g. Loch Ryan, Loch Sween, Loch Scridain, Loch Ailort, and West Loch Tarbert) and around Shetland (e.g. Gon Firth and Gruting Voe). Two oysters were recorded from the Firth of Forth in 2009.

Wider distribution - Found on all south and western coasts of the British Isles and occasionally on the east coast. In western Europe, it ranges from Norway to the Mediterranean and Morocco, and has been cultivated in North America, Japan and Australasia.

Feature status - Native oysters are the property of The Crown and their collection from the wild is unlawful without a licence from The Crown Estate. The majority of current records in the UK are from the west coast of Scotland although populations are significantly declined as a result of overfishing in the late 1800s and early 1900s. Perhaps the biggest threat to the surviving native oyster populations in Scotland today is unlawful harvesting from sea lochs.

Natural heritage importance	Information sources
OSPAR T&D	ARKive
Scottish Biodiversity List	MarLIN
UK BAP	OSPAR Case Report
	SNH - native oyster leaflet

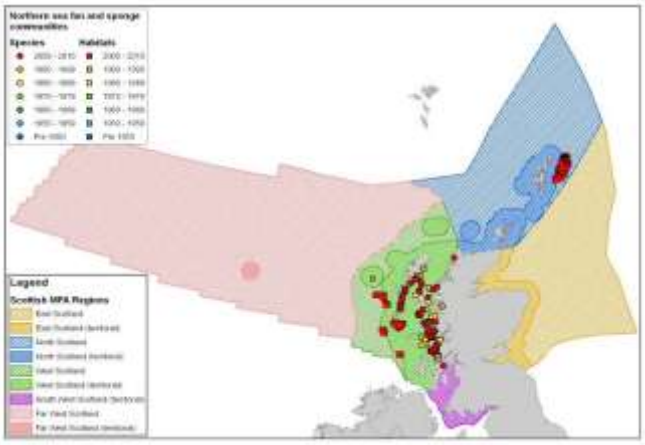
Broad habitat

NORTHERN SEA FAN AND SPONGE COMMUNITIES

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - A diverse habitat characterised by aggregations of the sea fan *Swiftia pallida* and the cup coral *Caryophyllia smithii* (**CarSwi**) on upper and vertical surfaces of bedrock and boulders (10-50m). With increasing water depth (35-120m+), and in areas of low tidal flow, erect branching sponges replace sea fans as the most striking component of the habitat (**DpSp**). Rock is colonised by sea firs, soft corals (e.g. dead man's fingers) and large sea squirts, with crevices providing shelter for sea cucumbers, squat lobsters and wrasse. In silty conditions (**CarSwi.Aglo**) sea fans, cup corals, and red sea fingers abound. As water flow increases (**CarSwi.LgAs**) less sponges and sea firs are present but sea fans are still frequent and, as the current increases further (**XFa.SwiLgAs**), so does the biodiversity.

Environmental preferences - Found on circalittoral bedrock and boulders on silty sediment, in extremely wave-exposed to wave sheltered areas and in fully marine conditions at 10-120m+.

Scottish distribution - Sea fan communities - west coast, Outer Hebrides and St. Kilda. Deep sponge communities - west coast, west of the Outer Hebrides and offshore waters to the east of Shetland.

Wider distribution - Sea fan communities - limited to a few records in the Kenmare River, SW Ireland. Deep sponge communities - Northern Ireland, the west coast of Ireland and the Isles of Scilly. The sea fan itself has a wider distribution including Norway, Sweden and deep waters off the Moroccan coast.

Feature status - These diverse communities are highly characteristic of moderately exposed reefs on the Scottish west coast. *S. pallida* can host the nationally rare sea fan anemone (*Amphianthus dohrnii*). Physical damage from the use of bottom gear on rocky seabed areas, such as potting, some fixed nets and trawling, may lead to the detachment of sessile species within this habitat. This habitat occurs at the southern limits of this sea fan, which is adapted to a temperature range of 4-13°C. A climate change induced increase in temperature may lead to the reduction or loss of *S. pallida* in Scottish waters.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Component biotopes and species in Scottish waters

Biotopes - *Caryophyllia smithii* and *Swiftia pallida* on circalittoral rock - **CR.MCR.EcCr.CarSwi** (v04.05), A4.211 (EUNIS). Includes: *Caryophyllia smithii*, *Swiftia pallida* and *Alcyonium glomeratum* on wave-sheltered circalittoral rock - **CR.MCR.EcCr.CarSwi.Aglo** (v04.05), A4.2111 (EUNIS); & *Caryophyllia smithii, Swiftia pallida* and large solitary ascidians on exposed or moderately exposed circalittoral rock - **CR.MCR.EcCr.CarSwi.LgAs** (v04.05), A4.2112 (EUNIS). Mixed turf of hydroids and large ascidians with *Swiftia pallida* and *Caryophyllia smithii* on weakly tide-swept circalittoral rock - **CR.HCR.XFa.SwiLgAs** (v04.05), A4.133 (EUNIS). Deep sponge communities (circalittoral) - **CR.HCR.DpSp** (v04.05), A4.12 (EUNIS), including: **DpSp.PhaAxi** (v04.05), A4.121 (EUNIS).
Species - Northern sea fan *Swiftia pallida*.

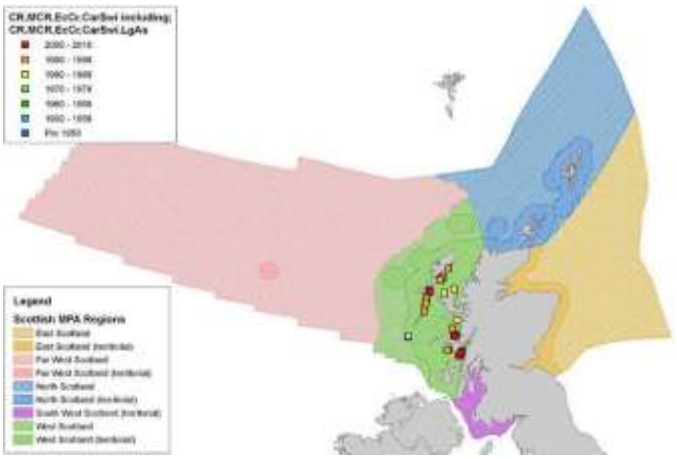
Component biotope name

***CARYOPHYLLIA SMITHII* AND *SWIFTIA PALLIDA* ON CIRCALITTORAL ROCK (CR.MCR.ECCR.CARSWI)**

Image

Image: Paul Kay

Distribution



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Feature description

Characteristics - Dense aggregations of the cup coral *Caryophyllia smithii* with occassional sea fans *Swiftia pallida* on upper and vertical surfaces of bedrock and boulders. Much of the rock surface is colonised by encrusting coralline and red seaweeds with barnacles, keel worms, sea mats, sparse sea firs, soft corals, large sea squirts and feather stars. Foliose red and brown algae may also occur in shallower examples of this habitat. Crevices and overhangs shelter sea cucumbers, squat lobsters and wrasse. Echinoderms are prevalent in the **CarSwi.LgAs** biotope, which has a lower diversity of species but greater numbers of large sea squirts and supports the white cluster anemone *Parazoanthus anguicomus*. In the siltier **CarSwi.Aglo** biotope, red sea fingers, sponges, and large sea cucumbers (e.g. the cotton spinner) increase in abundance.

Environmental preferences - Found on circalittoral bedrock and boulders on silty sediment, which are subject to weak tidal streams in fully marine conditions at 10-50m.

Scottish distribution - Recorded from the west coast (e.g. Mermaid's Reef in the Firth of Lorn, Loch Sunart and the Sound of Sleat) and the Outer Hebrides.

Wider distribution - The recorded distribution outside of Scotland is limited to a few records in Kenmare River, Ireland.

Feature status - Physical damage from the use of bottom gear on rocky seabed areas, such as potting, some fixed nets and trawling, may lead to the detachment of sessile species within this habitat. This habitat occurs at the southern limits of this sea fan, which is adapted to a temperature range of 4-13°C. A climate change induced increase in temperature may lead to the reduction or loss of *S. pallida* in Scottish waters.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

Caryophyllia smithii, *Swiftia pallida* and *Alcyonium glomeratum* on wave-sheltered circalittoral rock - **CR.MCR.EcCr.CarSwi.Aglo** (v04.05), CR.MCR.XFa.ErSSwi (v97.06), A4.2111 (EUNIS).
Caryophyllia smithii, Swiftia pallida and large solitary ascidians on exposed or moderately exposed circalittoral rock - **CR.MCR.EcCr.CarSwi.LgAs** (v04.05), CR.MCR.XFa.ErSSwi (v97.06), A4.2112 (EUNIS).

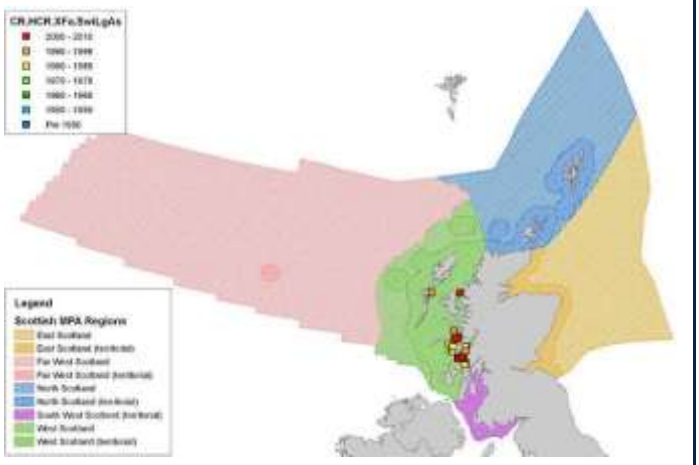
Component biotope name

MIXED TURF OF HYDROIDS AND LARGE ASCIDIANS WITH *SWIFTIA PALLIDA* AND *CARYOPHYLLIA SMITHII* ON WEAKLY TIDE-SWEPT CIRCALITTORAL ROCK (CR.HCR.XFA.SWILGAS)

Image

Image: SNH

Distribution



Feature description

Characteristics - A particularly diverse habitat with sea fans *Swiftia pallida*, cup corals *Caryophyllia smithii*, football sea squirts *Diazona violacea*, and numerous solitary sea squirts on the upper and vertical surfaces of bedrock and boulders. In addition to these large conspicuous species, rock surfaces are colonised by rich turf of mixed sea firs and erect sea mats overlying barnacles and encrusting coralline seaweeds. Foliose red and brown algae, axinellid sponges (e.g. the goblet sponge *Phakellia ventilabrum*), feather stars (e.g. northern feather star *Leptometra celtica*) and brachiopods may also be present. Overhangs and crevices shelter the long-clawed squat lobster *Munida rugosa*. Starfish scavenge over the rocks while sea urchins and top shells graze algae and encrusting animals from the rock surfaces.

Environmental preferences - Found on circalittoral bedrock and boulders on silty sediment which is subject to moderately strong to weak tidal streams in fully marine conditions from 14 - 37m.

Scottish distribution - Sparse records from the west coast (e.g. the Firth of Lorn, Loch Tuath, Loch na Keal, Loch Sunart and Ardnamurchan Point).

Wider distribution - This biotope is believed to be restricted to Scottish waters.

Feature status - Physical damage from fishing activities such as potting may cause damage or dislodge sessile species within this habitat. This habitat occurs at the southern limits of this sea fan, which is adapted to a temperature range of 4-13°C.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

No sub-component biotopes

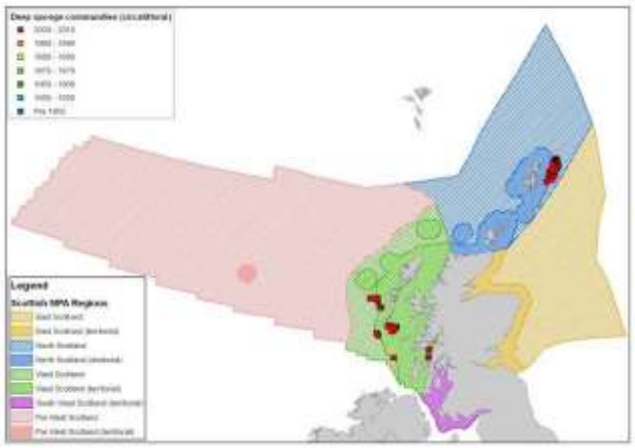
Component biotope name

DEEP SPONGE COMMUNITIES (CIRCALITTORAL) (CR.HCR.DPSP)

Image

Image: Marine Scotland Science

Distribution



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Feature description

Characteristics - Bedrock and boulders in deep water supporting a striking sponge community. This is dominated by erect species such as *Phakellia ventilabrum*, *Axinella infundibuliformis*, *Stelligera stuposa* and *Raspailia hispida* (**PhaAxi**); other encrusting sponges may also be present (e.g. the blue sponge *Hymedesmia paupertas*). The yellow boring sponge *Cliona celata* and elephant's ear sponge *Pachymatisma johnstonia* can dominate nearshore examples of this biotope in areas subject to moderate current flow. A range of filter feeding invertebrates are associated with these communities such as keelworms, encrusting and erect sea mats, and soft corals (e.g. dead man's fingers). The cup coral *Caryophyllia smithii* is widespread and may be abundant. Grazing molluscs (including painted top shells) and common sea urchins occur in low numbers, together with larger carnivorous echinoderms; the starfish *Strichastrella rosea* and *Solaster endeca*. Brittlestars and long clawed squat lobsters are widely distributed. Occasionally the northern sea fan is found and, where conditions allow, may be numerous in localised areas.

Environmental preferences - Typically occurs on wave-exposed rock subject to very weak-moderate current flow at depths greater than 35m.

Scottish distribution - Clusters of records found in offshore waters to the north-east of Shetland (Pobie Bank) and to the west of the Hebrides. It is also thought to occur on Pobie Bank in offshore waters to the north east of Scotland. Closer inshore, the habitat is located off the coast of Mingulay and within the Firth of Lorn.

Wider distribution - Recorded from Northern Ireland and the west coast of Ireland.

Feature status - Likely to be more widespread in Scottish waters than currently believed. Sensitive to physical abrasion, smothering and pollution.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification
MarLIN
SNH Commissioned Reports (Nos. 306 and 190)

Sub-component biotopes in Scottish waters

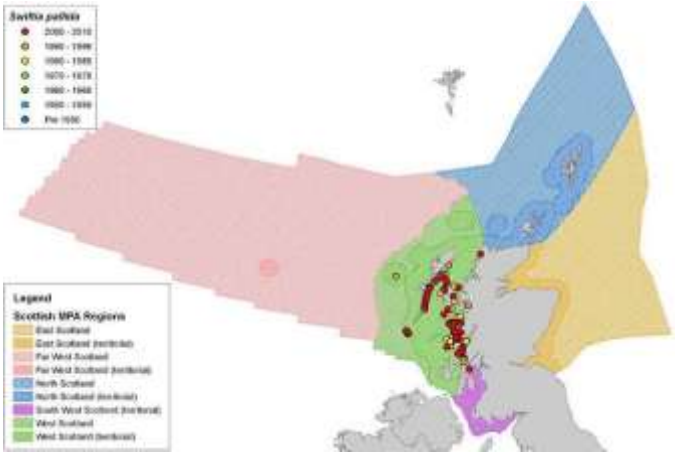
Phakellia ventilabrum and axinellid sponges on deep, wave-exposed circalittoral rock - **CR.HCR.DpSp.PhaAxi** (v04.05), CR.MCR.XFa.PhaAxi (v97.06), A4.121 (EUNIS).

Common name - *Scientific name*	Species group
NORTHERN SEA FAN - *SWIFTIA PALLIDA*	**Sea anemones, sea fans and seapens**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - A sea fan comprising a central axis surrounded by tissue and many small polyps. Sea fans grow directly up from the rocks to which they are attached, the main axis branching to form a fan shape. The colonies are small, growing up to 30cm tall, with occasional branching. The branches are arranged at irregular angles and look twig-like. The colonies are white or greyish in colour, sometimes with a pinkish tinge.

Habitat - Generally found in areas of good water movement, attached to rocks and boulders, and at depths of 20-60m (althought it has been recorded at over 2000m). Also found on pebbles and cobbles lying in coarse shell, sand and silt.

Feeding - Feeds on plankton and suspended organic particles.

Scottish distribution - Sea lochs and inlets along the west coast from Loch Laxford south to the Sound of Jura. Also recorded from the Outer Hebrides and St Kilda. May occur in offshore waters.

Wider distribution - Recorded at two sites on the south-west coast of Ireland. Also found in Norway and Sweden, and in deep water from the Bay of Biscay, Mediterranean, Madeira and Morocco.

Feature status - 97% of the current UK records are restricted to the west coast of Scotland. This species is a host for the nationally rare sea fan anemone *Amphianthus dohrnii*. Sensitive to physical abrasion, siltation, pollution and climate change. Pressures may include mobile demersal fishing activities and aquaculture. A climate change induced increase in temperature may lead to the reduction or loss of *S. pallida* in Scottish waters.

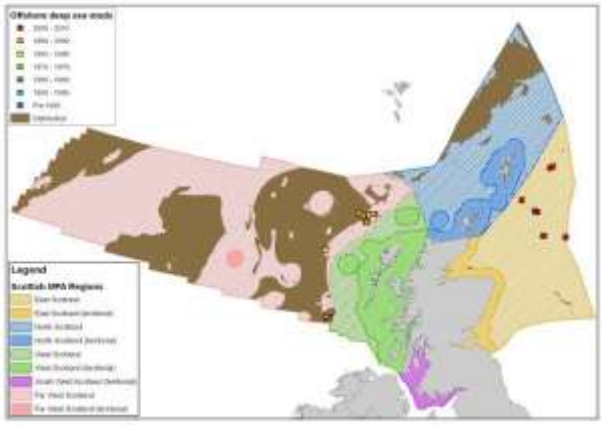
Natural heritage importance	Information sources
UK BAP	Encyclopedia of Marine Life MarLIN

Broad habitat

OFFSHORE DEEP SEA MUDS

Image

Distribution



Feature description

Characteristics - Offshore deep sea muds support a wealth of biological diversity despite often appearing as featureless environments. The most common larger surface-dwelling animals are the echinoderms, including sea cucumbers, brittlestars and sea urchins. Other mobile species in or on the seabed include various types of 'worms', sea spiders, amphipods, bivalves, molluscs, crustaceans and fish species. Bathymetry, current velocity, bottom water-mass distribution and particle size of the mud (clay, silty or sandy) all have a significant influence on the distribution and composition of the seabed communities present. This habitat also includes the Atlantic and Arctic bathyal and abyssal sediments which occur off the continental slope in Scotland and those on the continental slope.

Environmental preferences - Offshore waters down to depths of 2500m.

Scottish distribution - Widespread in the offshore to the north and west of Scotland.

Wider distribution - One of the most common deep water habitats in the UK offshore marine environment.

Feature status - Hydrocarbon exploration and demersal trawling for commercially important fish species can result in the removal of non-target species and disturbance of the the communities found associated with this habitat.

Natural heritage importance

Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
Plymouth University Marine Institute
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Selected component biotopes of Offshore circalittoral mud - **SS.SMu.OMu** (v04.05), COS (v96.07), A5.37 (EUNIS). Includes: *Ampharete falcata* turf with *Parvicardium ovale* on cohesive muddy sediment near margins of deep stratified seas - **SS.SMu.OMu.AfalPova** (v04.05), A5.371 (EUNIS); Foraminiferans and *Thyasira spp.* in deep circalittoral fine mud - **SS.SMu.OMu.ForThy** (v04.05), A5.372 (EUNIS); *Levinsenia gracilis* and *Heteromastus filifirmis* in offshore circalittoral mud and sandy mud - **SS.SMu.OMu.LevHet** (v04.05), A5.375 (EUNIS); *Paramphinome jeffreysii*, *Thyasira* spp. and *Amphiura filiformis* in offshore circalittoral sandy mud - **SS.SMu.OMu.PjefThyAfil** (v04.05), A5.376 (EUNIS); and *Myrtea spinifera* and polychaetes in offshore circalittoral sandy mud - **SS.SMu.OMu.MyrPo** (v04.05), A5.377 (EUNIS). Atlantic and Arctic bathyal and abyssal sediments - no code.

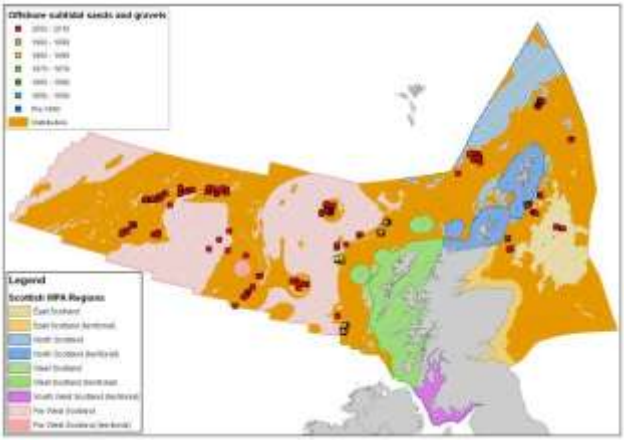
Broad habitat

OFFSHORE SUBTIDAL SANDS AND GRAVELS

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Sand and gravel sediments are the most common subtidal habitat around the coast of the British Isles. Offshore sands and gravels are more stable than their shallower equivalents with diverse infaunal communities dominated by polychaetes; hatchet shells (**OCS.GlapThyAmy**) and small bivalves e.g. the little tellin (**OCS.HeloPkef**). Offshore fine to muddy sands support a diversity of tube building polychaetes, burrowing brittlestars, polychaetes and bivalves (**OSa.OfusAfil** and **OSa.MalEdaf**), while the pea urchin occurs in medium sands (**CFiSaEpusOborApri**) and amphipods and hooded shrimp in fine sands (**CFiSa.ApriBatPo**). Mobile predators include flatfish, starfish, crabs and hermit crabs. This habitat also includes the Atlantic and Arctic bathyal and abyssal sediments which occur off the continental slope in Scotland and those on the continental slope.

Environmental preferences - Occur in wave sheltered to highly wave exposed conditions. The sediment (sand or gravel) and surface features (sand waves or ripples) depend on the environmental conditions present. This habitat is found at depths from 80-3000m.

Scottish distribution - Widespread in offshore waters.

Wider distribution - One of the most common habitats in the UK offshore marine environment.

Feature status - Offshore gravel and sand habitats support internationally important commercial fisheries e.g. scallops, flatfish, sandeels, and are important nursery grounds for juvenile commercial fish species such as sandeels, flatfish, bass, skates, rays and sharks. They are threatened by demersal trawling and other activities that physically disturb the seabed.

Natural heritage importance

UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Component biotopes in Scottish waters

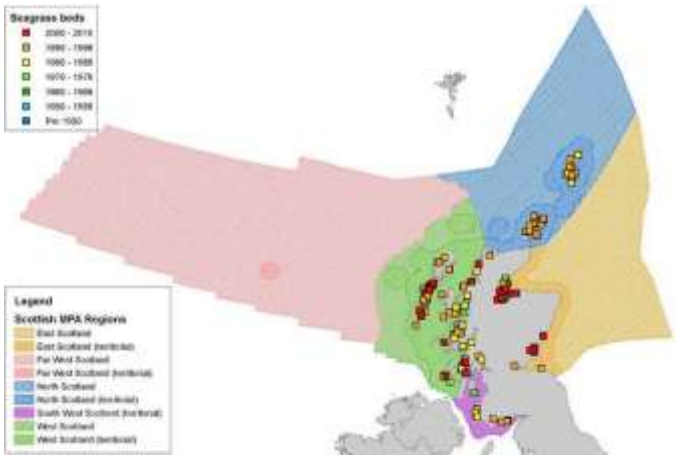
Offshore coarse sand - **SS.SCS.OCS**. Includes: *Glycera lapidum*, *Thyasira* spp. and *Amythasides macroglossus* in offshore gravelly sand **SS.SCS.OCS.GlapThyAmy** (v04.05), A5.141 (EUNIS); *Hesionura elongata* and *Protodorvillea kefersteini* in offshore coarse sand **SS.SCS.OCS.HeloPkef** (v04.05), A5.142 (EUNIS). Circalittoral fine sand - **SS.SSa.CFiSa**. Includes: *Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica* in circalittoral fine sand **SS.SSa.CFiSa.EpusOborApri** (v04.05), MCR.Flu in part (v96.7), A5.251 (EUNIS); *Abra prismatica, Bathyporeia elegans* and polychaetes in circalittoral fine sand **SS.SSa.CFiSa.ApriBatPo** (v04.05), A5.252 (EUNIS). Offshore circalittoral sand or muddy sand - **SS.SSa.OSa**. Includes: *Maldanid polychaetes* and *Eudorellopsis deformis* in offshore circalittoral sand or muddy sand **SS.SSa.OSa.MalEdef** (v04.05), A5.271 (EUNIS); *Owenia fusiformis* and *Amphiura filiformis* in offshore circalittoral sand or muddy sand **SS.SSa.OSa.OfusAfil**, IMX.LsacX (v97.06), A5.272 (EUNIS). Atlantic and Arctic bathyal and abyssal sediments - no code.

Broad habitat

SEAGRASS BEDS

Image

Distribution



Feature description

Characteristics - Seagrasses are marine flowering plants found in shallow coastal areas around the world, typically on sheltered sandy or muddy substrata. Seagrasses often grow in dense, extensive beds or meadows, stabilising the sediment and creating productive habitats that provide shelter and food for a wide variety of plants and animals (including other species of conservation importance and commercially important fish species). Three seagrass bed communities are encompassed by this broad habitat; two eelgrass biotopes (*Zostera* spp.) and one dominated by the tasselweed *Ruppia maritima*.

Environmental preferences - The seagrasses grow in sands and muds from the middle of the shore down to 10m, in areas at least moderately sheltered from wave action such as sea lochs, inlets, bays, sounds, channels and lagoons. Dwarf eelgrass (*Zostera noltii*) is found highest on the shore, while the common eelgrass (*Z. marina*) is predominantly subtidal. Narrow-leaved eelgrass, a variety of common eelgrass (Z. *marina* var. *angustifolia*), is found intertidally on the mid to lower shore. The beaked tasselweed (*Ruppia maritima*) is usually found in the shallow subtidal from 1-5m.

Scottish distribution - The different component biotopes have been recorded all around Scotland, with noted beds in the Cromarty, Dornoch and Beauly Firths; the Sounds of Barra and Harris; and in Orkney.

Wider distribution - Beds of dwarf eelgrass are known from the south-west of England and the Essex and north Kent coasts. Common eelgrass beds are recorded from Ireland, Wales and south-west England. Beaked tasselweed co-occurs with both eelgrass species in the Fleet in Dorest.

Feature status - Scotland holds 20% of the eelgrass beds in north-west Europe, and the Cromarty Firth supports the largest known area of dwarf eelgrass in Britain. Seagrass beds are particularly sensitive to physical damage (e.g. trampling in the intertidal or anchoring in the subtidal), nutrient increases and siltation, which reduces the amount of sunlight reaching the leaves. Currently UK seagrass populations are considered degraded following significant declines (fungal ‘wasting’ disease in the 1920’s and ‘30’s).

Natural heritage importance

EC Habitats Directive Annex I
OSPAR T&D (*Zostera* spp.)
Scottish Biodiversity List
UK BAP

Information sources

OSPAR Case Report (*Zostera* spp.)
UK BAP Habitat Definitions
UK Marine SACs Overview (*Zostera* spp.)
WWF Marine Health Check (*Zostera* spp.)

Component biotopes in Scottish waters

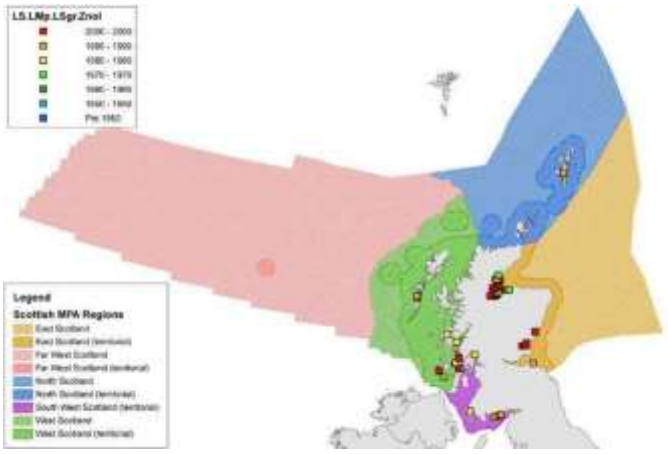
Zostera marina/angustifolia beds on lower shore or infralittoral clean or muddy sand - **SS.SMp.SSgr.Zmar** (v04.05), IMS.Zmar (v97.06), A5.5331 (EUNIS). *Zostera noltii* beds in littoral muddy sand - **LS.LMp.LSgr.Znol** (v.04.05), LMS.Zos.Znol (v97.06), A2.6111 (EUNIS). *Ruppia maritima* in reduced salinity infralittoral muddy sand - **SS.SMp.SSgr.Rup** (v.04.05), IMS.Rup (v97.06), A5.5343 (EUNIS).

Component biotope name

***ZOSTERA NOLTII* BEDS IN LITTORAL MUDDY SAND (LS.LMP.LSGR.ZNOL)**

Image

Distribution



Feature description

Characteristics - An abundance of dwarf eelgrass *Zostera noltii*, found on the mid to upper shore, often permanently submerged in small pools, or in muddy substrates where water is retained, preventing the roots from drying out. *Z. noltii* may overlap with narrow-leaved eelgrass *Z. marina* var. *angustifolia* on the mid to lower shore. To qualify as a *Zostera* 'bed', plant densities should provide at least 5% cover. The seagrass roots stabilise and bind the sediment, supporting a community of polychaete worms, mud shrimps and bivalves (often associated with cockle beds). Mud snails, shore crabs and green algae live among the seagrass leaves. Intertidal seagrass beds are an important food source for over-wintering wildfowl.

Environmental preferences - Found on the mid to upper shore on muddy sand or sandy mud in full or variable salinity, on wave-sheltered coasts in a range of tidal conditions.

Scottish distribution - Scattered around the Scottish coastline, with extensive beds in the east (e.g. Cromarty Firth, Beauly Firth, Dornoch Firth, and Loch Fleet); and other beds in Loch of Hellister (Shetland), Loch Bee (Uist), Bridgend Flats (Islay), Loch Tarbert and the Solway Firth.

Wider distribution - Sparsely distributed around the UK including northern Ireland, north and south Wales and south-west England, with particularly extensive stands along the Essex and north Kent coasts. Outside the UK, *Z. noltii* is found along the Atlantic coasts of Europe from southern Norway to Mauritania.

Feature status - The Cromarty Firth supports the largest known area of intertidal seagrass (mixed dwarf and narrow-leaved eelgrass communitiy) in Britain, possibly in Europe, covering an area of approximately 12000km^2. Dwarf eelgrass beds are particularly sensitive to habitat loss / physical damage (e.g. shellfish extraction, trampling and bait digging); changes in water flow (e.g. the introduction of artificial structures); nutrient enrichment and chemical contamination (e.g. from agricultural run-off); smothering / siltation (e.g. coastal development); and the introduction of non-native species.

Natural heritage importance

EC Habitats Directive Annex I (Mudflats & Lagoons)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
UK BAP Habitat Definitions
UK Marine SACs Overview

Sub-component biotopes in Scottish waters

No sub-component biotopes

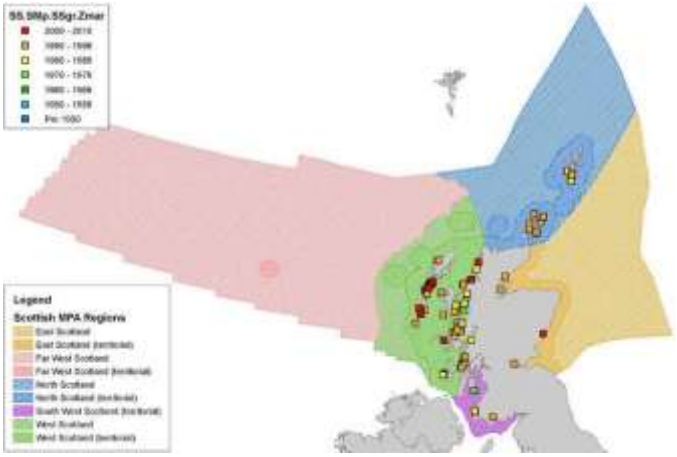
Component biotope name

***ZOSTERA MARINA/ANGUSTIFOLIA* BEDS ON LOWER SHORE OR INFRALITTORAL CLEAN OR MUDDY SAND (SS.SMP.SSGR.ZMAR)**

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Dense beds of narrow-leaved eelgrass *Z. marina* var. *angustifolia* (leaves 2-3mm wide and 15 -30cm long) grow on the mid to lower shore, while the larger common eelgrass *Zostera marina* (leaves 4-10mm wide and 20-150cm long) is predominantly subtidal. *Zostera* plant densities typically provide greater than 30% cover of the seabed (at least 5% is required to qualify as a 'bed'), but plant growth within a bed may be patchy. The seagrass meadows, which can vary in size from 10's of m^2 to several km^2, stabilise sediment through their network of roots, provide food for waterfowl and create a surface for attachment of algae, diatoms, hydroids and sea anemones. The sediment supports worms, bivalves and snails while the seagrass leaves provide shelter for crabs and fish species.

Environmental preferences - Sands and muds on the lower shore and subtidally down to 10m in areas afforded at least some shelter from wave action, such as sea lochs, inlets, bays, sounds, and lagoons, in a range of tidal conditions. Full or variable salinity.

Scottish distribution - Recorded throughout Scotland, but more frequently on the west coast (e.g. Wigtown Bay, Loch Ryan, Islay, Loch Sween, Loch Gairloch), the Outer Hebrides (e.g. Sounds of Barra and Harris), Orkney and Shetland; than the east coast (e.g. Dornoch and Cromarty Firths).

Wider distribution - Recorded from Ireland, Wales, and south-west England. *Zostera marina* itself ranges from the Arctic Circle south to Spain and the Mediterranean in the east, and from Alaska to North Carolina in the west.

Feature status - Scotland supports 20% of the eelgrass beds in north-west Europe. These beds provide a natural sea defence by binding sediment and absorbing the energy of incoming waves. Subtial seagrass beds provide nursery areas for commercially important fish species (including flatfish and pollock), and are a preferred habitat for other species of conservation importance, such as stalked jellyfish. Seagrass beds are particularly sensitive to physical damage (e.g. anchoring), nutrient increases and siltation. Currently UK seagrass populations are considered degraded, following significant declines.

Natural heritage importance

EC Habitats Directive Annex I (Sandbanks & Lagoons)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

MarLIN
OSPAR Case Report
UK BAP Habitat Definitions
UK Marine SACs Overview
WWF Marine Health Check

Sub-component biotopes in Scottish waters

No sub-component biotopes

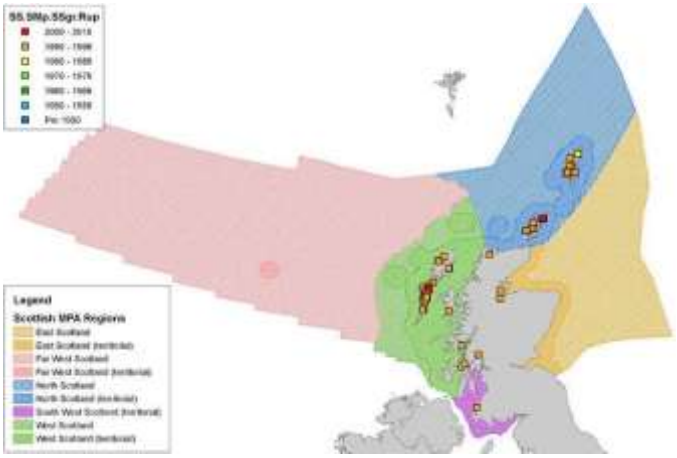
Component biotope name

***RUPPIA MARITIMA* IN REDUCED SALINITY INFRALITTORAL MUDDY SAND (SS.SMP.SSGR.RUP)**

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - Beds of the beaked tasselweed *Ruppia maritima* grow in soft sediments in brackish waters of lagoonal habitats, lochs and estuaries. Filamentous green seaweeds such as *Chaetomorpha* spp. and *Cladophora* spp. are often present in addition to occasional fucoids. In some cases the foxtail stonewort *Lamprothamnium papulosum* and rough stonewort *Chara aspera* occur. Infaunal and epifaunal species may include mysid crustaceans, blow lugworms, mud snails, mud shrimps and oligochaetes. The beds may support three- and fifteen spined sticklebacks. In some areas, the eelgrass *Zostera marina* may be interspersed with the *Ruppia*.

Environmental preferences - Found in soft muddy sand and mud, in extremely sheltered and shallow (0-5m) brackish coastal waters.

Scottish distribution - Found on the west coast (e.g. Ballantrae Bay, upper Loch Fyne and Loch Sween), the Outer Hebrides (e.g. Loch Obisary, Loch Roag and Obain Loch Euphoirt), Loch Eriboll on the north coast, Orkney (e.g. Sanday and the Loch of Stenness), Shetland (e.g. the Vadills) and, intertidally in the Cromarty Firth.

Wider distribution - Sparsely distributed around the UK with beds known to occur in south Wales and in the Fleet, Dorset. *Ruppia maritima* has been described from the Netherlands and from France.

Feature status - Scotland holds most of the records of *Ruppia* beds in the UK. Sensitive to: physical damage / substratum loss; increased water flow, wave exposure and turbidity; organic enrichment; synthetic contaminants and hydrocarbons.

Natural heritage importance

EC Habitats Directive Annex I (Lagoons)
Scottish Biodiversity List
UK BAP

Information sources

UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

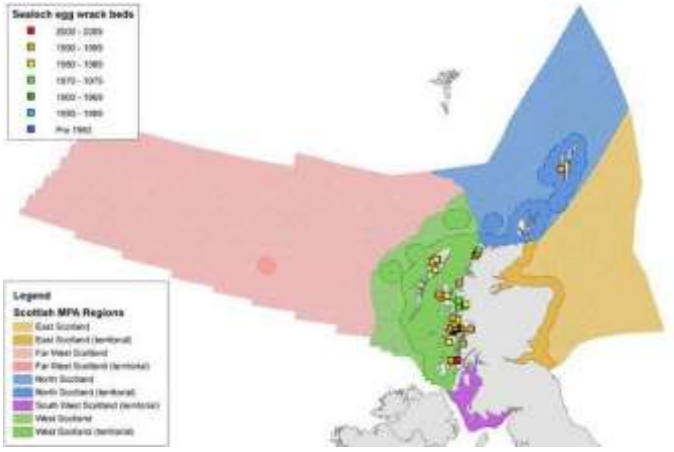
No sub-component biotopes

Broad habitat

SEA LOCH EGG WRACK BEDS

Image

Distribution



Feature description

Characteristics - A detached dwarf variety of the common egg wrack (*Ascophyllum nodosum*). Individual plants rarely exceed 60cm in diameter but they often grow together to form dense mats. Occurs as two forms - the 'beach' form is olive green or yellow, very branched, and may appear bent and irregularly twisted; whereas the smaller 'turf' form is found on the upper shore as individual plants where it forms small clumps or mats. The complex three dimensional structure provides a humid habitat for shrimp, crabs, snails, winkles, eels and small fish, while mussels, barnacles and worms often live among the pebbles and within the mud below.

Environmental preferences - Found only in very sheltered conditions such as at the heads of sea lochs, on the mid to lower reaches of gently sloping shores where it sometimes grows with other brown seaweeds.

Scottish distribution - Found along the west coast from Loch Sween to Loch Laxford, in the Outer Hebrides (e.g. Lochs Roag and Seaforth), and within Brindister Voe in Shetland.

Wider distribution - Also found in Northern Ireland, in Newfoundland, Canada and on saltmarsh around the north-west Atlantic.

Feature status - Scottish records are of global importance. The habitat is highly sensitive to coastal development (e.g. infilling, road and causeway development) and pollution. Sea loch egg wrack is still collected on a small scale in some areas on the west coast for the extraction of alginates and for use as a packaging material during shellfish transport.

Natural heritage importance

EC Habitats Directive Annex I (Mudflats)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
Plantlife - *Back from the Brink*

Component biotopes in Scottish waters

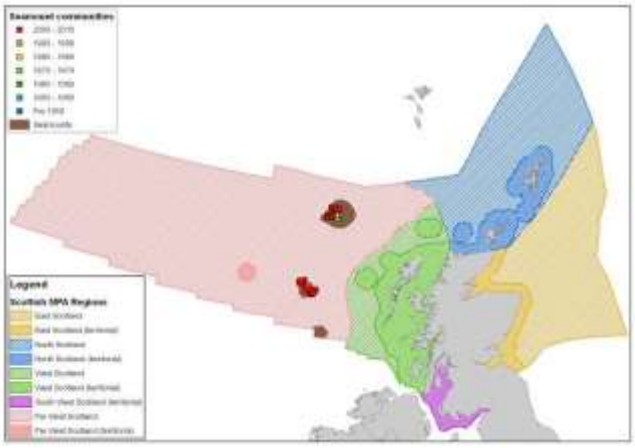
Ascophyllum nodosum ecad *mackaii* beds on extremely sheltered mid eulittoral mixed substrata - **LR.LLR.FVS.Ascmac** (v.04.05), SLR.AscX.mac (v.97.06), A1.325 (EUNIS).

Broad habitat

SEAMOUNT COMMUNITIES

Image

Distribution



Feature description

Characteristics - Seamounts have been described as 'hotspots' for marine life, offering a distinct environment from the characteristically flat, sediment covered abyssal plain from which they arise. The presence of an exposed hard substrate for marine life to settle on and the effect of their size and relief on oceanic currents create ideal conditions for a range of suspension feeders which form the basis of seamount communities. Typically these communities comprise cold-water corals (principally *Lophelia pertusa*), coral garden species (such as black corals, lace corals and bamboo corals) and deep water sponges. Concentrations of deep water fish species, such as orange roughy and blue ling, aggregate around seamounts and live in close association with the benthic communities they harbour. The biological richness of seamount communities is also attractive to spawning aggregations of fish which draw top predators including a range of shark species and cetaceans.

Environmental preferences - Primarily volcanic in origin, seamounts tend to be found near mid-ocean ridges (boundary line between two pieces of the Earth's crust). By definition they rise to at least 1000 metres above the seafloor with peaks that do not reach the water's surface and are therefore confined to Scottish west coast offshore waters.

Scottish distribution - Anton Dohrn, Rosemary Bank and Hebrides Terrace.

Wider distribution - More than 800 seamounts have been recorded across the North Atlantic. The majority are present at the Mid-Atlantic Ridge between Iceland and the Hayes Fracture Zone in the deep water off the coast of West Africa.

Feature status - Demersal and pelagic trawling operations, long-lining and deep sea mining pose a threat to seamount communities. As many of the communities associated with seamounts tend to be long lived, recovery from damage may take thousands of years if they recover at all.

Natural heritage importance

OSPAR T&D
UK BAP

Information sources

OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Seamounts, knolls and banks A6.72 (EUNIS).

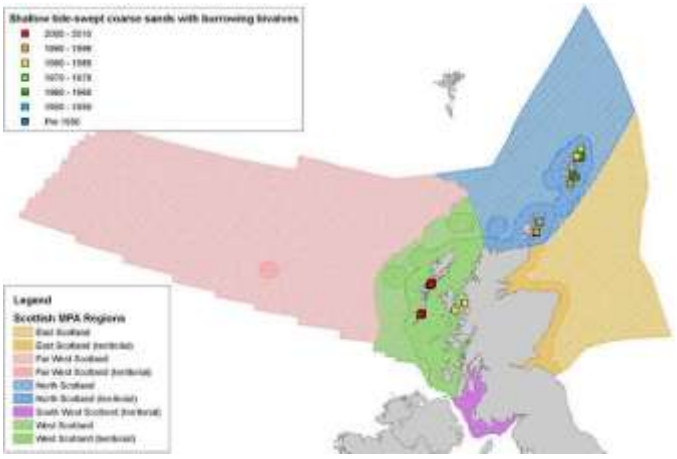
Broad habitat

SHALLOW TIDE-SWEPT COARSE SANDS WITH BURROWING BIVALVES

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Tide-swept coarse and gravelly sands in the shallow subtidal support an abundance of burrowing bivalves, particularly *Tellina* spp. and polychaete worms. In some areas, this habitat supports surf clams (*Spisula solida*). Suspension feeding bivalves dominate and are abundant in the coarse sediment. Infaunal species also include tanaids (shrimp-like crustaceans) and sand hoppers. The bivalves may be preyed upon by starfish, snails and flatfish. Seaweeds including sugar kelp (*Saccharina latissima*) and *Ulva* spp. may be present on the sediment surface attached to small pebbles and larger shells.

Environmental preferences - Coarse, gravelly infralittoral sand (0-20m) on open coasts and in the mouths of sea lochs, subject to moderately strong tidal water movement.

Scottish distribution - The recorded distribution of this habitat is very limited, with the majority of records from Shetland, Orkney and some instances on the west coast of Scotland (e.g. Loch Slapin and Loch Kishorn) and the Outer Hebrides (e.g. Sounds of Barra and Harris).

Wider distribution - This biotope is very scarcely distributed around the rest of the UK and Ireland, with few records reported from south Devon and Cornwall, the Scilly Isles and north-west Wales.

Feature status - Scottish records are of national importance. This habitat may be targeted for scallop dredging and surf clam fisheries. Whilst many components of this dynamic habitat are moderately robust, the large bodied, slow growing bivalves are sensitive to physical disturbance.

Natural heritage importance	Information sources
Scottish Biodiversity List	JNCC Marine Habitat Classification MarLIN

Component biotopes in Scottish waters

Moerella spp. (now *Tellina* spp.) with venerid bivalves in infralittoral gravelly sand - **SS.SCS.ICS.MoeVen** (v04.05), A5.123 (EUNIS).

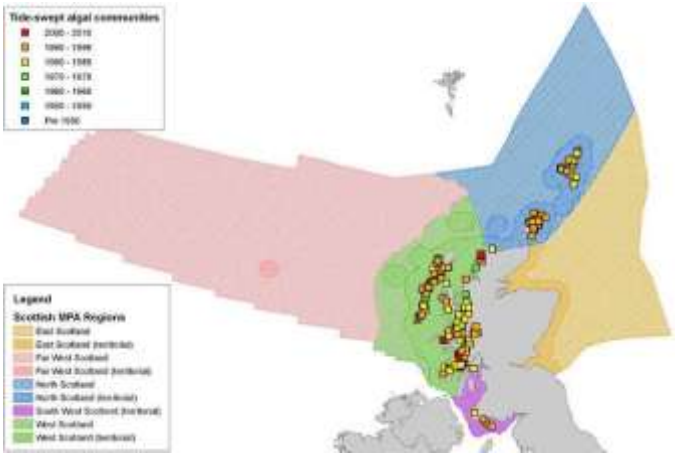
Broad habitat

TIDE-SWEPT ALGAL COMMUNITIES

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Bedrock and mixed substrata swept by strong tidal currents and dominated by large seaweeds such as fucoids and kelps that form dense forests or sparse parks with increasing water depth. As in terrestrial forests, the kelps and fucoids form a canopy that provides shelter for an under-storey of sheltering plants and animals such as foliose red seaweeds, sea squirts, sea mats and sea firs. Some species grow on the seaweeds themselves. The bedrock or boulders below provide important habitats for limpets, winkles, dog whelks, tube worms, sponges, crabs and starfish.

Environmental preferences - Sheltered to wave-exposed tidal channels, often at the entrance of or near to sea lochs, between coastal islands, or between islands and the mainland where tidal flow is funnelled by the shape of the coastline. This habitat can occur from the mid shore down to depths of 30m, in full or variable salinity.

Scottish distribution - Recorded from west Scotland (e.g. the Strait of Corryvreckan and the Falls of Lora), the Outer Hebrides (e.g. the Sound of Harris), Orkney (e.g. Eynhallow Sound) and Shetland (e.g. the Narrows).

Wider distribution - Widely distributed around the UK and Ireland, especially on the west coast.

Feature status - Species rich, structurally complex habitats. The different component biotopes may be subject to kelp and wrack harvesting with effects on habitat structure and species diversity, and mixed finer substrata examples of this habitat may be subject to pressure from mobile demersal fishing. Any activity that reduces water flow (e.g. coastal development) will adversely affect these habitats.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP

Information sources

UK BAP Habitat Definitions

Component biotopes in Scottish waters

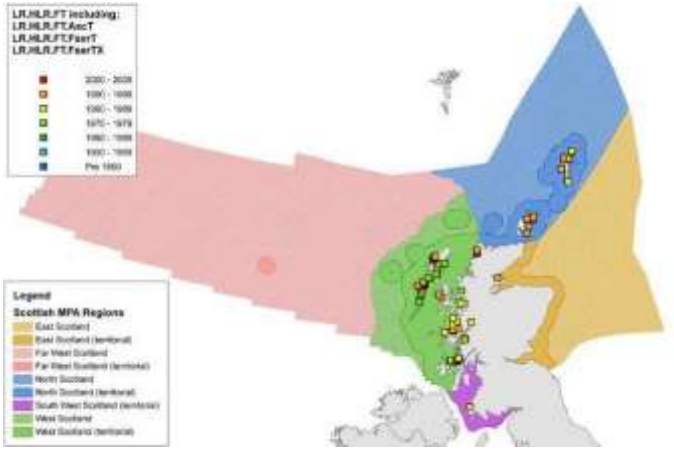
Fucoids in tide-swept conditions - **LR.HLR.FT** (v04.05), A1.15 (EUNIS), includes 3 biotopes; **LR.HLR.FT.AscT** (v04.05), **LR.HLR.FT.FserT** (v04.05), **LR.HLR.FT.FserTX** (v04.05). *Halidrys siliquosa* and mixed kelps on tide-swept infralittoral rock with coarse sediment - **IR.HIR.KSed.XKHal** (v04.05), MIR.HalXK (v97.06), A3.12 (EUNIS). *Laminaria hyperborea* on tide-swept infralittoral mixed substrata - **IR.MIR.KR.LhypTX** (v04.05), A3.213 (EUNIS). Kelp and seaweed communities in tide-swept sheltered conditions - **IR.MIR.KT** (v04.05), A3.22 (EUNIS), includes only the following 3 specific biotopes: **IR.MIR.KT.LdigT** (v04.05); **IR.MIR.KT.XKT** (v04.05); and **IR.MIR.KT.XKTX** (v04.05).

Component biotope name

FUCOIDS IN TIDE-SWEPT CONDITIONS (LR.HLR.FT)

Image

Distribution



Feature description

Characteristics - A tide-swept algal community dominated by a canopy of brown fucoid seaweeds (egg and toothed wracks) that provide shelter and habitat for plants and animals below. The bedrock and boulders are colonised by an understorey of red and green seaweeds, coralline crusts, limpets, winkles, dog whelks, tube worms, crabs and starfish. Sea firs, sea squirts and sponges colonise the surface of seaweeds and rock.

Environmental preferences - Tide-swept, sheltered rocky shores.

Scottish distribution - Recorded in sea lochs, embayments and amongst coastal island clusters in the Outer Hebrides (e.g. Loch nam Madadh and the tidal rapids in Tob Valasay), Orkney (e.g. Shapinsay Sound, Hunda Reef and Scapa Flow), Shetland (e.g. Yell Sound), and the west to north-west coast of Scotland (e.g. Loch Laxford).

Wider distribution - Widely distributed around the UK.

Feature status - A diverse, species rich, structurally complex habitat. Scottish records are of national importance representing over 60% of the UK's resource. Egg wrack (and possibly toothed wrack) is subject to sustainable harvesting in parts of the Outer Hebrides. Large brown seaweeds are susceptible to damage from trampling and activities that reduce water flow (e.g. coastal development).

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

Ascophyllum nodosum, sponges and ascidians on tide-swept mid eulittoral rock - **LR.HLR.FT.AscT** (v04.05), SLR.ASC.T (v97.06), A1.151 (EUNIS). *Fucus serratus*, sponges and ascidians on tide-swept lower eulittoral rock - **LR.HLR.FT.FserT** (v04.05), SLR.Fserr.T (v97.06), A1.152 (EUNIS). *Fucus serratus* with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata - **LR.HLR.FT.FserTX** (v04.05), SLR.FserX.T (v97.06), A1.153 (EUNIS).

Component biotope name

***HALIDRYS SILIQUOSA* AND MIXED KELPS ON TIDE-SWEPT INFRALITTORAL ROCK WITH COARSE SEDIMENT (IR.HIR.KSED.XKHAL)**

Image

Image: SNH

Distribution

Feature description

Characteristics - A tide-swept algal community dominated by dense brown seaweeds, particularly the sea oak (*Halidrys siliquosa*) and kelps. The seaweed canopy provides shelter and a habitat for a diverse community of red seaweeds, sea firs, sea mats and sea squirts to colonise. The bedrock is colonised by tube worms, sponges, crabs, starfish, top shells and dahlia sea anemones.

Environmental preferences - Tide-swept boulders and cobbles, often with a mobile component to the substrata (pebbles, gravel and sand) in fully marine conditions.

Scottish distribution - There are very few records of this biotope in Scotland but it is likely to be under-recorded. Confirmed from Luce Bay (north Solway), Islay, the Sound of Arisaig, Loch Brittle (Skye), the Sound of Harris, Loch Roag (Lewis), Loch Eriboll, and Noss Sound in Shetland. Also known to be present in Loch Sween and the Sound of Barra.

Wider distribution - The majority of records of this biotope are scattered around the UK, including west Wales, the Scilly Isles, south-west England and Northern Ireland.

Feature status - A very diverse, species rich, structurally complex and nationally important habitat. Pressures on this habitat may include mobile demersal fishing. Activities that reduce water flow (e.g. coastal development and the emplacement of artificial structures) will adversely affect these habitats.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

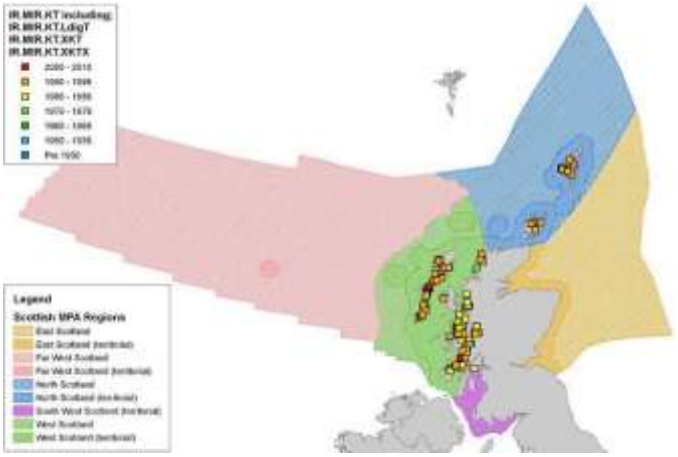
No sub-component biotopes

Component biotope name

KELP AND SEAWEED COMMUNITIES IN TIDE-SWEPT SHELTERED CONDITIONS (IR.MIR.KT)

Image

Distribution



Feature description

Characteristics - Tide-swept algal communities dominated by dense stands of kelp, together with a high diversity of red seaweeds. The strong water flow supports a wide variety of sessile animals, e.g. sponges, sea squirts and sea mats on both the bedrock and the seaweeds. In the sublittoral fringe, oarweed (*Laminaria digitata*) dominates while on the tide scoured rock of sea loch sills and narrows, dense cuvie (*Laminaria hyperborea*) and sugar kelp forests form. In areas of boulders and gravel, the kelp canopy is less dense but with a greater diversity of red seaweeds and occasionally maerl.

Environmental preferences - Occurs on the sheltered tide-swept bedrock and boulders in the tidal rapids of sea lochs.

Scottish distribution - A large proportion of the recorded UK distribution is found in the Scottish sea lochs and within tide-swept channels and sounds on the west coast (e.g. Sound of Islay, Falls of Lora), Outer Hebrides (e.g. Loch nam Madadh), Orkney (e.g. Shapinsay Sound) and Shetland (e.g. The Narrows).

Wider distribution - Predominantly recorded along the west coasts of the UK and Ireland.

Feature status - A species rich, structurally complex habitat. Scottish records are of national importance. The different component biotopes may be subject to localised harvesting of the kelp with effects on habitat structure and species diversity. Activities that reduce water flow (e.g. coastal development and the introduction of artificial structures) will adversely affect these habitats.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

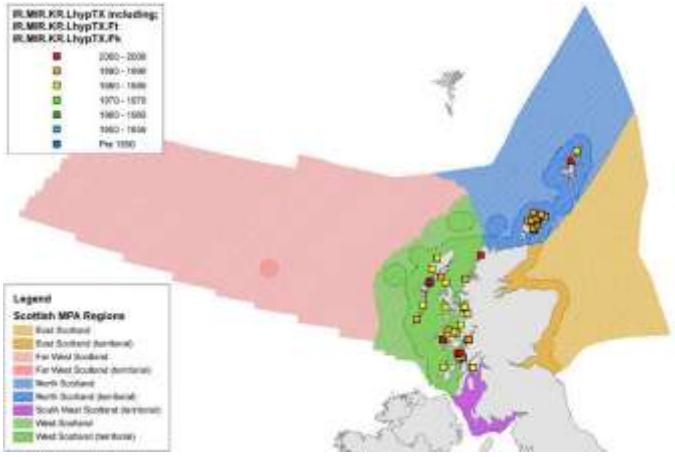
Laminaria digitata, ascidians and bryozoans on tide-swept sublittoral fringe rock - **IR.MIR.KT.LdigT** (v04.05), IR.MIR.KT.LdigT (v97.06), A3.221 (EUNIS). Mixed kelp with foliose red seaweeds, sponges and ascidians on sheltered tide-swept infralittoral rock - **IR.MIR.KT.XKT** (v04.05), Lsac.T (v97.06), A3.222 (EUNIS). Mixed kelp and red seaweeds on infralittoral boulders, cobbles and gravel in tidal rapids - **IR.MIR.KT.XKTX** (v04.05), Lsac.T (v97.06), A3.223 (EUNIS).

Component biotope name

***LAMINARIA HYPERBOREA* ON TIDE-SWEPT INFRALITTORAL MIXED SUBSTRATA (IR.MIR.KR.LHYPTX)**

Image

Distribution



Feature description

Characteristics - A tide-swept algal community dominated by dense forests or parks of kelp (*Laminaria hyperborea*) depending on depth. The kelp canopy supports a diverse under-storey of red seaweeds on the rocks together with sponges, sea squirts, sea mats and sea anemones. Red seaweeds, sea squirts, sea firs, sea mats and sea chervil also grow on the kelp itself. The habitat also supports a range of mobile animals, including grazing snails and sea slugs, grazing sea urchins, starfish and fish.

Environmental preferences - Occurs on wave-exposed to sheltered tide-swept bedrock, boulders, cobbles, pebbles and gravel in tidally accelerated areas such as sounds and straits and sea lochs rapids.

Scottish distribution - Found in Orkney (e.g. Shapinsay Sound and Eynhallow Sound), down the west coast (e.g. Loch Ewe and Balach Rocks), around the Outer Hebrides (e.g. Sound of Harris) and in Shetland (e.g. Bluemull Sound and Sullom Voe).

Wider distribution - Scattered occurrence around the UK, with a notable abundance of records from east Northern Ireland.

Feature status - A species rich, structurally complex habitat. Scottish records are of national importance as most of the UK's records of this habitat occur in Scotland. The two component biotopes may be subject to localised harvesting of the kelp with effects on habitat composition and species diversity. Pressures on this habitat may include mobile demersal fishing. Activities that reduce water flow (e.g. coastal development and the introduction of artificial structures) will adversely affect these habitats.

Natural heritage importance	Information sources
EC Habitats Directive Annex I (Reefs)	JNCC Marine Habitat Classification
Scottish Biodiversity List	MarLIN
UK BAP	UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

Laminaria hyperborea forest and foliose red seaweeds on tide-swept upper infralittoral mixed substrata - **IR.MIR.KR.LhypTX.Ft** (v04.05), IR.MIR.KR.LhypTFt (v97.06), A3.2131 (EUNIS). *Laminaria hyperborea* park and foliose red seaweeds on tide-swept lower infralittoral mixed substrata - **IR.MIR.KR.LhypTX.Pk** (v04.05), IR.MIR.KR.LhypTPk (v97.06), A3.2132 (EUNIS).

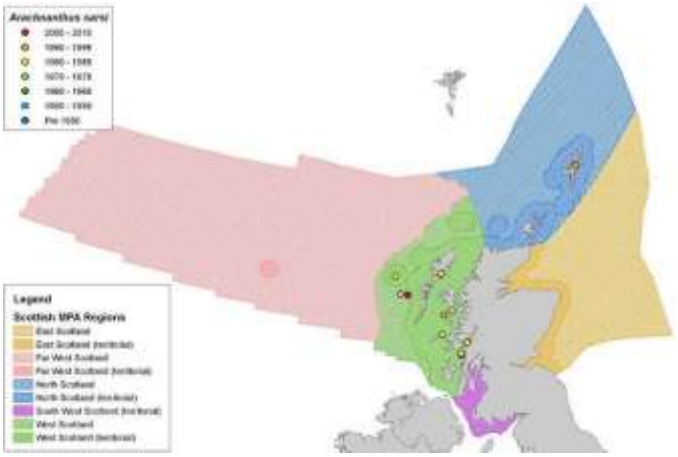
LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL WATERS

Common name - *Scientific name*	Species group
BURROWING SEA ANEMONE AGGREGATIONS[2] **-** ***ARACHNANTHUS SARSI***	**Sea anemones, sea fans and seapens**
Other name(s) - scarce tube-dwelling anemone	***Recent synonym*** - none

Image

Image: Bernard Picton

Distribution



Feature description

Characteristics - A large sea anemone, up to 20cm high when fully expanded, that lives in a tube in the seabed. The tentacles are white-grey or pinkish in colour, often with diffuse brown bands. They are arranged in two cycles of 30 long outer and 30 shorter inner tentacles. The inner tentacles point inwards and upwards to form a cone and are dark brown on the inner surface.

Habitat - Lives in a parchment-like tube, into which it can rapidly withdraw, buried in mud, sand or shelly mud sediment at 10-36m.

Feeding - Feeds on plankton and suspended organic particles.

Scottish distribution - Scattered records around the west coast of Scotland, from St. Kilda, west Uist and south-east Lewis in the Hebrides, the Isle of Skye, the Isle of Canna, the Firth of Lorn, and Lunna Bay in Shetland.

Wider distribution - Recorded from northern UK, Ireland and Norway.

Feature status - Most of the records of this species are from Scotland. Populations are isolated and fragmented and recruitment is likely to be sporadic and episodic. Pressures on this species include mobile demersal fishing activities.

Natural heritage importance	Information sources
Scottish Biodiversity List Nationally rare in UK UK BAP	Encyclopedia of Marine Life MarLIN

[2] No longer being considered as a driver for identification in the MPA network following Workshop 3.

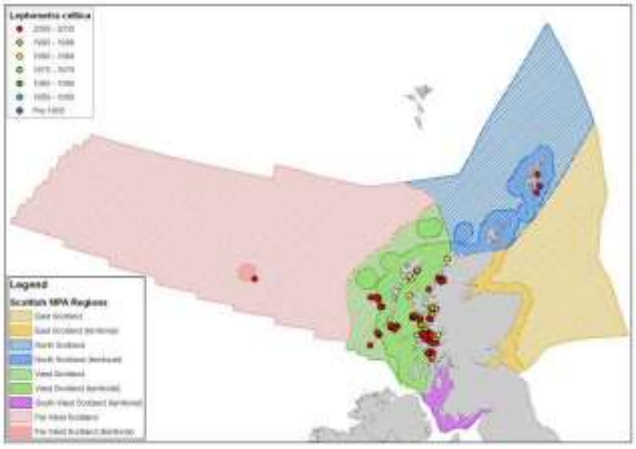
LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL AND OFFSHORE WATERS

Common name - *Scientific name*	Species group
NORTHERN FEATHER STAR AGGREGATIONS - *LEPTOMETRA CELTICA*	**Starfish and feather stars**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Christine Howson / SNH

Distribution



Feature description

Characteristics - Feather stars are relatives of starfish. Each of the northern feather stars 10 arms has numerous neat side branches giving the appearance of a feather. Its arms are 7-15cm long and may be brown, yellow, white, pinky-red, or banded red and white. Like starfish, the arms are connected to a central disc. Beneath the central disc, feather stars have slender and pure white hair-like legs, each with 40-50 joints, used for crawling or holding on to the substratum. This feather star can be seen to spread its arms out in vertical fan to catch food in passing currents.

Habitat - Commonly found on sediment, shell, gravel or bedrock from 40-200m but has also been recorded in Scottish sea lochs as shallow as 20m in areas sheltered from wave action with good water flow. In the right conditions, feather stars can form very dense aggregations making up a significant component of the seabed community.

Feeding - Feeds on plankton and suspended organic particles.

Scottish distribution - Occurs in western and northern Scotland from west Shetland, the Minches, south to the Sound of Jura, and offshore Rockall Bank and Stanton Banks.

Wider distribution - Recorded throughout the western coasts of the British Isles but with few records outside Scotland. It also ranges from the Faeroes and the Atlantic coast of France to Morocco, into the southern Mediterranean, and down to south and west Africa.

Feature status - As a characteristic sea loch species, northern feather stars are restricted to the west coasts of the British Isles. While not uncommon in Scottish waters, there are few nearshore records around the rest of the UK. Where aggregations of northern feather stars are associated with coarse sediments, likely pressures include mobile demersal fishing activities.

Natural heritage importance	Information sources
	Encyclopaedia of Marine Life MarLIN

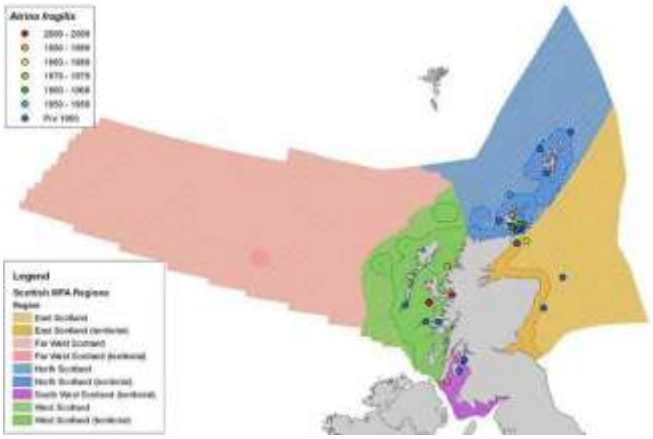
LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL AND OFFSHORE WATERS

Common name - *Scientific name*	Species group
FAN MUSSEL AGGREGATIONS - *ATRINA FRAGILIS*	**Snails, clams, mussels and oysters**
Other name(s) - sea wings, fan shell	***Recent synonym*** - *Atrina pectinata*

Image

Image: Sue Scott

Distribution



Feature description

Characteristics - One of Britain's largest and most threatened molluscs, growing 30-48cm in length. The fragile shell is triangular, thin and brittle, and is tapered to a point. The shell is light yellow-brown to dark brown in colour. Fan mussels live with their pointed end buried in sediment, attached by many fine byssal threads, and the broad end protruding from the surface. Often solitary but may occur in clusters or aggregations.

Habitat - Found embedded in lower intertidal and subtidal muds, sandy muds or gravels, at sites sheltered from water movement down to 400m.

Feeding - Feeds on plankton and suspended organic particles.

Scottish distribution - Found on northern and western Scottish coasts from Shetland and Orkney, the Minches, south to Arran, with a few records on the east coast. The densest known aggregation of fan mussels in UK waters was recorded off Canna in 2009. Survey work is ongoing at this location to ascertain the full extent of fan mussel habitat.

Wider distribution - Found on the western and southern UK coasts, the Scilly Isles, Channel Isles, and south to the Iberian Peninsula.

Feature status - Over 50% of recent UK records are from Scottish waters (Marine Conservation Society, 2010). Once common, it has declined severely and is thought to be one of the most endangered molluscs in Britain. Pressures on this species include scallop dredging.

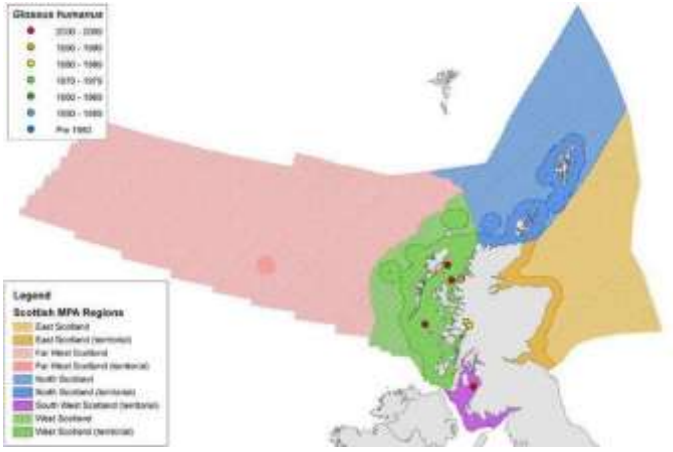
Natural heritage importance	Information sources
Nationally scarce in the UK Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981	Encyclopaedia of Marine Life MarLIN

LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL WATERS
Common name - *Scientific name*	**Species group**
HEART COCKLE AGGREGATIONS[3] **- *GLOSSUS HUMANUS***	**Snails, clams, mussels and oysters**
Other name(s) - ox heart cockle, ox heart clam	***Recent synonym*** - none

Image

Image: National Museum Wales

Distribution



Feature description

Characteristics - A large heart-shaped shell up to 10cm long. Its two shells are rounded and the beaks of the shell curve spirally, away from the hinge, giving it the characteristic heart-shape when viewed from the side. The shell is deep and thick but light weight, yellow-white in colour with a dark brown, red-brown or very dark green thick outer layer with firm short radiating hairs sometimes giving the shell a glossy golden appearance.

Habitat - May be found in soft muds and sands below 7m but is considered a deep water species more usually found below 50m, in undisturbed sediment. Sometimes associated with the mud around cold-water coral reefs.

Feeding - Feeds on phytoplankton and suspended organic particles.

Scottish distribution - Scattered records along the western coast and the Hebrides, e.g. in the Minches, upper Loch Linnhe and Loch Eil, and the Firth of Clyde.

Wider distribution - Potentially found offshore around all of the British Isles, from Norway and Greenland south to the Adriatic, Iberian Peninsula and the Mediterranean.

Feature status - Scottish records represent 80% of inshore records for this species in the UK. It is likely to be under recorded and may be more abundant offshore. Likely pressures on this species include mobile demersal fishing activities.

Natural heritage importance	Information sources
	Conchological Society NMW Marine Bivalve Shells of the British Isles MarLIN

[3] No longer being considered as a driver for identification in the MPA network following Workshop 3.

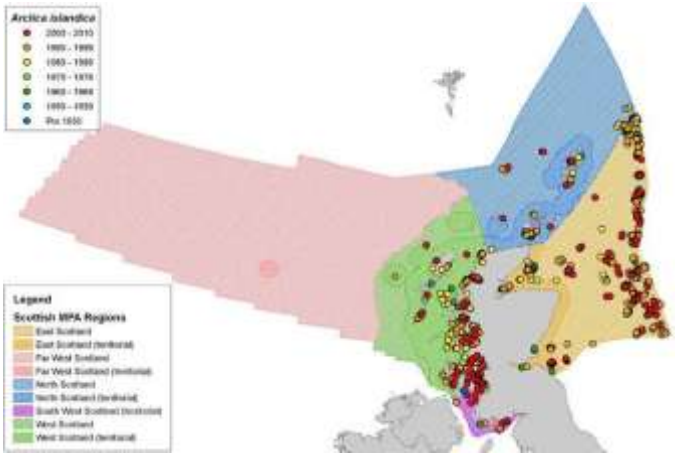
LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL AND OFFSHORE WATERS

Common name - *Scientific name*	Species group
OCEAN QUAHOG AGGREGATIONS - *ARCTICA ISLANDICA*	**Snails, clams, mussels and oysters**
Other name(s) - Icelandic cyprine, mahogany clam, mahogany quahog, black quahog, black clam	***Recent synonym*** - none

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - The ocean quahog is the longest living mollusc and may live for over 400 years. It is a large, slow growing clam, reaching 11-13cm in length. The shell is thick, round and oval or circular shaped. The outer layer of the shell is thick, glossy and brown, greenish brown or black. Parts of the outer layer may be worn away to reveal a white, pale brown to yellow shell.

Habitat - Found in the subtidal, burrowing 6cm down into sandy and muddy sediment. It is most often found between depths of 10-280m, although may be found as deep as 480m.

Feeding - Filter feeds on phytoplankton and organic particles.

Scottish distribution - Found around all western, northern and eastern Scottish coasts. Mainly offshore in the east of Scotland and the northern North Sea but closer inshore along the west coast.

Wider distribution - Found around all British and Irish coasts and offshore. Recorded from Iceland, the Faeroes and the White Sea to the Bay of Biscay in the west Atlantic and from Labrador to North Carolina in the east.

Feature status - 70% of the British records for this species occur in Scottish waters. Pressures on this species include direct mechanical damage and habitat modification caused by mobile demersal fishing activities.

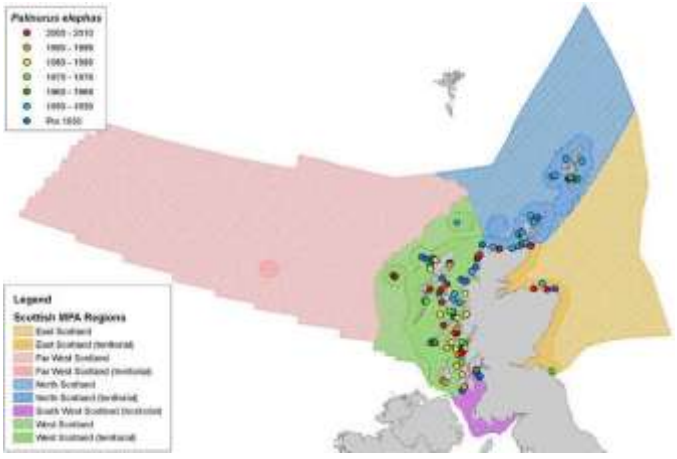
Natural heritage importance	Information sources
OSPAR T&D	Encyclopedia of life MarLIN NOAA NMFS Technical Memorandum OSPAR Case Report

MOBILE SPECIES	TERRITORIAL WATERS
Common name - *Scientific name*	**Species group**
EUROPEAN SPINY LOBSTER[4] - *PALINURUS ELEPHAS*	**Lobsters and sand hoppers**
Other name(s) - common spiny lobster, red lobster, crayfish, crawfish	***Recent synonym*** - *Palinurus vulgaris*

Image

Image: Paul Kay

Distribution



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Feature description

Characteristics - A large spiny lobster or crayfish, which grows up to 60cm in length. It has a stout, heavily armoured body, with two long antennae and small hook-like claws. It is usually orange in colour, with darker spines and a white underbelly. Its shell is covered by many sharp spines.

Habitat - Primarily associated with areas of subtidal rock but can occur on sand, muddy gravels or in seagrass beds. Usually occurs at depths of 5-70m but can be found at depths of up to 160m. It migrates seasonally between deep offshore waters in winter and shallower coastal waters in summer.

Feeding - Feeds at night on echinoderms (starfish and sea urchins), small snails, bivalve molluscs, microalgae, shrimp larvae, sea mats, worms, and detritus.

Scottish distribution - Mostly found along the west and north coasts of Scotland, with records from Orkney and Shetland and occasional records on the east coast. Historically high abundance in the Outer Hebrides.

Wider distribution - Found throughout the UK, although most records occur in the south-west. It also ranges from Norway to Morocco and the Mediterranean.

Feature status - Believed to have declined markedly since the 1970s, European spiny lobsters are now thought to be scarce across the whole of the UK. There is insufficient data available to assess population trends in Scottish waters.

Natural heritage importance	Information sources
UK BAP	Encyclopaedia of Marine Life MarLIN

[4] No longer being considered as a driver for identification in the MPA network following Workshop 3.

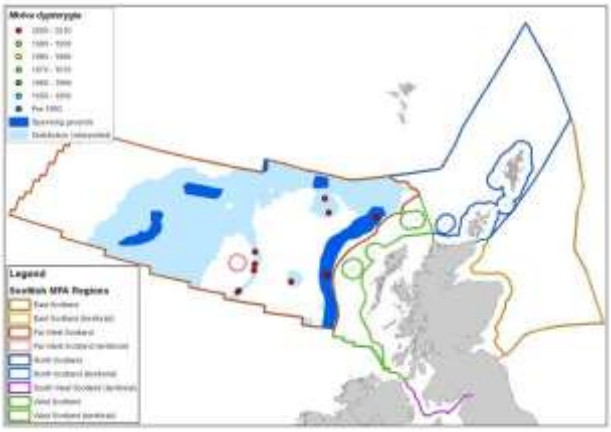
MOBILE SPECIES	OFFSHORE WATERS

Common name - *Scientific name*	Species group
BLUE LING - *MOLVA DYPTERYGIA*	**Bony fish**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Francis Neat

Distribution



Feature description

Characteristics - A member of the cod family with an elongate, slender body that grows to about 1.2m in length. They are grey-brown in colour, with white undersides. They have a characteristic short barbel (dangling protrusion) on their lower jaw.

Habitat - Blue ling are a demersal fish species usually found on the continental slope at depths of between 300-500m, often on muddy bottoms. However, spawning aggregations of blue ling tend to be found in association with raised features of the seabed such as banks, mounds and seamounts, and peak at depths of between 730-1100m.

Feeding - Feeds on crustaceans and fish.

Scottish distribution - Widely distributed along the continental slope and on offshore banks west of Scotland. There are known spawning locations on Hatton Bank, Rosemary Bank, Lousy Bank and on the continental slope.

Wider distribution - North-east Atlantic from the Barents Sea and Iceland to Morocco and western Mediterranean. North-west Atlantic from Greenland to Newfoundland.

Feature status - Blue ling form large spawning aggregations which make them particularly susceptible to overexploitation. ICES consider this stock to be depleted. They therefore advise that there should be no directed fisheries for blue ling and that efforts should be made to limit catches in mixed fisheries. The EU has implemented several area closures to protect spawning aggregations.

Natural heritage importance	Information sources
UK BAP	FAO Species Fact Sheet Fishbase ICES Advice 2010 MarLIN MCS FishOnline

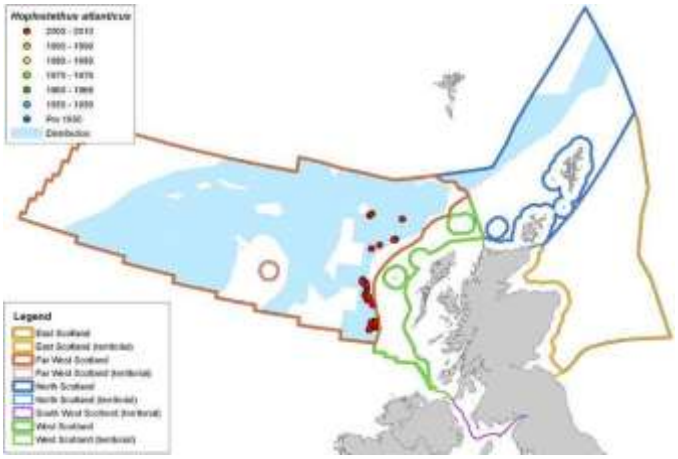
MOBILE SPECIES	OFFSHORE WATERS

Common name - *Scientific name*	Species group
ORANGE ROUGHY - *HOPLOSTETHUS ATLANTICUS*	**Bony fish**
Other name(s) - deep sea perch, red roughy, rosy soldier fish	***Recent synonym*** - none

Image

Image: JNCC

Distribution



Feature description

Characteristics - This deep water fish species can reach up to 75cm in length and weigh up to 7kg. When caught, orange roughy are bright brick red colour, however recent underwater filming has revealed that they are able to change colour very rapidly and are often white when alive. Has a large head and eyes, with a deep oval shaped body.

Habitat - Deep water over the continental slope between 150-1800m but generally deeper than 1000m. They form dense aggregations around undersea structures such as seamounts and canyons but can also be found at lower densities on flat areas of deep seabed.

Feeding - Feeds on crustaceans, squid and fish.

Scottish distribution - In deep water to the north and west of Scotland.

Wider distribution - A global but patchy deep water distribution.

Feature status - Orange roughy are very slow growing and may live for more than 130 years. They also tend to aggregate around underwater features such as seamounts and canyons. These characteristics make orange roughy particularly susceptible to overexploitation. Once depleted orange roughy populations take decades to recover. Large aggregations once occurred around some Scottish seamounts but these have been severely depleted by fishing.

Natural heritage importance	Information sources
OSPAR T&D UK BAP	FAO Species Fact Sheet Fishbase ICES Advice 2010 Mar-Eco MarLIN MCS FishOnline

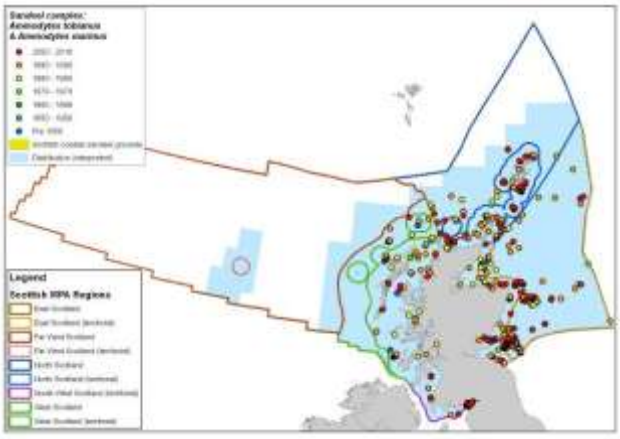
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS

Common name - *Scientific name*	Species group
SANDEELS - *AMMODYTES MARINUS* AND *AMMODYTES TOBIANUS*	**Bony fish**
Other name(s) - none	***Recent synonym*** - none

Image

Image: Paul Kay

Distribution



Feature description

Characteristics - Sandeels are slender-bodied fish with protuberant lower jaws. They have long dorsal and anal fins leading to a forked tail fin. They are usually blue to yellowish green in colour on top, with silver sides and underside. Individual species are difficult to distinguish but tend to inhabit different depths. Lesser sandeels (*Ammodytes tobianus*) grow to about 20cm in length while Raitt's sandeel (*A. marinus*) may reach up to 25cm in length.

Habitat - Sandeels are burrowing fish, found in areas with sandy, low silt sediments, where they remained buried between September and February. Sandeels have demersal eggs and after a few weeks to months, the larvae metamorphose and swim to their habitat in May and June. During spring and summer they form large schools in the water column.

Feeding - Feed on zooplankton (primarily copepods and other crustaceans).

Scottish distribution - All Scottish coasts and offshore, particularly in the North Sea (only *A. marinus* occurs in offshore waters).

Wider distribution - At depths <130m (usually <80m) in the north-east Atlantic Ocean through to the Channel Islands and Western English Channel. Common throughout UK and Irish waters.

Feature status - A commercially important fish for animal feed and oil, but with considerable restrictions on exploitation now in place in Scottish waters. Sandeel numbers have varied, seemingly due to a mixture of historic overfishing and changes in food supply possibly due to climate change. Sandeels are an important food source for seabirds, and declines in several populations (e.g. black legged kittiwake) have been linked to declines in local sandeel density and the time of year when suitably sized juvenile sandeels become available. Sandeel density around Shetland tends to vary more than other regions due to the dependence on immigration from other grounds and a local fishery is no longer economically viable. An area off the east coast of Scotland is closed to fishing and there are licensing restrictions on the west coast.

Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	FishBase Marine Scotland Science MarLIN RSPB

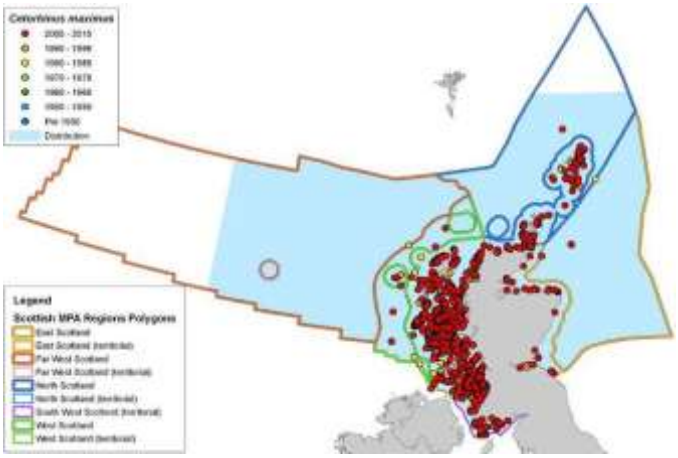
MOBILE SPECIES	TERRITORIAL WATERS

Common name - *Scientific name*	Species group
BASKING SHARK - *CETORHINUS MAXIMUS*	**Sharks, skates and rays**
Other name(s) - elephant shark	***Recent synonym*** - none

Image

Image: Paul Naylor

Distribution



Feature description

Characteristics - The largest fish to visit British waters and the second largest fish in the world growing up to 12m in length. They have a stout body, moon-shaped tail and five long gill slits that run from the back behind the head to round under the throat. They are slate grey to black on their backs and paler underneath. They sometimes 'bask' at the surface, swimming slowly with their mouths wide open, with the snout and dorsal fin visible above water.

Habitat - Migrates over large distances in both offshore pelagic and coastal waters at depths from the surface to over 750m. Often feeds along tidal fronts on the continental shelf and shelf edge.

Feeding - Feeds on plankton by filtering water, which passes in through the mouth and out through the comb-like rakers on the gills.

Scottish distribution - Occasional records from all Scottish coasts with sightings 'hot spots' identified on the west coast of Scotland where observations peak in summer months. Large aggregations of this species on the west coast may be using the area for social and courtship-like behaviour.

Wider distribution - Recorded globally throughout temperate waters and is migratory, probably following food.

Feature status - Due to slow growth, late maturation and small litter sizes, basking sharks are unable to recover quickly from population declines experienced as a result of targeted fisheries. Fishing for this species is now banned throughout European waters. Boat collisions and disturbance continue to be a potential threat to populations in British waters. They are listed as 'Endangered' in the north-east Atlantic and their status is thought to be 'Vulnerable' globally.

Natural heritage importance	Information sources
CITES Appendix II	ARKive
IUCN Red list (Vulnerable)	FishBase
OSPAR T&D	MarLIN
Scottish Biodiversity List	Shark Trust
UK BAP	SNH Commissioned Research Report No. 339
Wildlife and Countryside Act 1981	

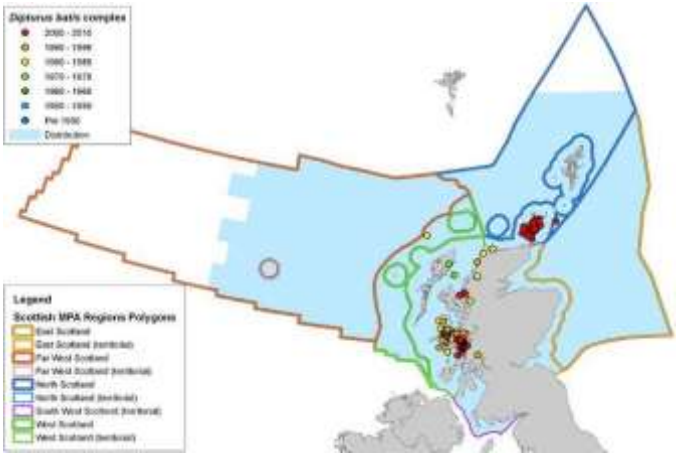
MOBILE SPECIES	TERRITORIAL WATERS

Common name - *Scientific name*	Species group
COMMON SKATE - *DIPTURUS BATIS* COMPLEX	**Sharks, skates and rays**
Other name(s) - blue skate, flapper skate	***Recent synonym*** - *Raja batis*

Image

Image: James Thorburn

Distribution



Feature description

Characteristics - Recent studies have shown that the common skate is in fact two species; the blue skate and the flapper skate. The blue skate is found further south in the UK and it is the flapper skate that is predominantly recorded in Scottish waters. This once common skate is the largest in European waters and can grow up to 3m in length. It has a long pointed snout. The upper-side is brownish-green with lighter spots (although not all specimens have these). Young skate have a black underside, which fades to paler grey or cream as the skate ages. They have a row of 12-18 thorns along the tail.

Habitat - Lives on sandy, muddy and gravel bottoms from the coast down to 600m.

Feeding - An opportunistic feeder, preferring scavenging when available, this species feeds on worms, sandeels, crabs, molluscs and flatfish on the seabed. It is also known to actively hunt fish and smaller elasmobranchs within the water column.

Scottish distribution - Once found throughout Scottish waters, it has now disappeared from the North Sea (except in the far north) and the Irish Sea.

Wider distribution - North-east Atlantic from Iceland, the Faroe Islands and northern Norway to Senegal. Now absent from large parts of its former range, including the southern North Sea, the Irish Sea and the western Mediterranean.

Feature status - Once an abundant fish in north-west Europe, populations have undergone a significant decline around the British Isles since the early part of the 20th century due to overfishing. The Isle of Mull, Sound of Jura and the Firth of Lorn retain seemingly healthy populations.

Natural heritage importance	Information sources
IUCN Red List (Critically endangered)	Fishbase
OSPAR T&D	MarLIN
Scottish Biodiversity List	OSPAR Case Report
UK BAP	Shark Trust
Wildlife and Countryside Act 1981	

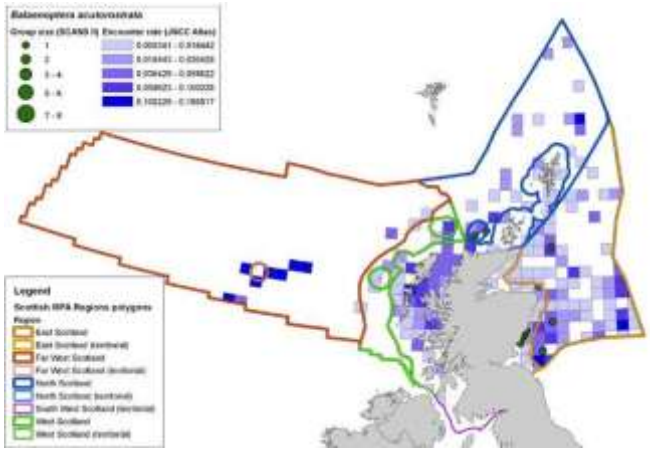
MOBILE SPECIES	TERRITORIAL WATERS

Common name - *Scientific name*	Species group
MINKE WHALE - *BALAENOPTERA ACUTOROSTRATA*	**Whales, dolphins and porpoises**
Other name(s) - lesser rorqual	***Recent synonym*** - none

Image

Image: P. Evans / Seawatch Foundation

Distribution



Feature description

Characteristics - Minke whales are the smallest of the baleen whales, with adult males reaching lengths of around 8m and females 8.8m. They have a sleek body, distinctive V-shaped head and an upper fin that is relatively tall and curved. Minke whales have a dark grey back, white underside, and streaks of lighter grey on each side. They live for up to 50 years and reach breeding age at 6-7 years. Minke whales are known to breach and often carry out aerial behaviour. Group sizes tend to be small (1-3 individuals) but larger numbers may aggregate in areas of increased food availability.

Habitat - Areas of open coast, straits/sounds and sea lochs, occasionally recorded in deep offshore waters.

Feeding - Feed primarily on invertebrates and small schooling fish such as sandeels and mackerel.

Scottish distribution - Occurs throughout Scottish waters.

Wider distribution - Widely distributed from the tropics to subpolar regions. Their migration patterns are not fully understood.

Conservation status - Minke whales are particularly sensitive to noise disturbance (e.g. from shipping, renewable energy and oil and gas operations), dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch. Globally, dedicated hunts still occur.

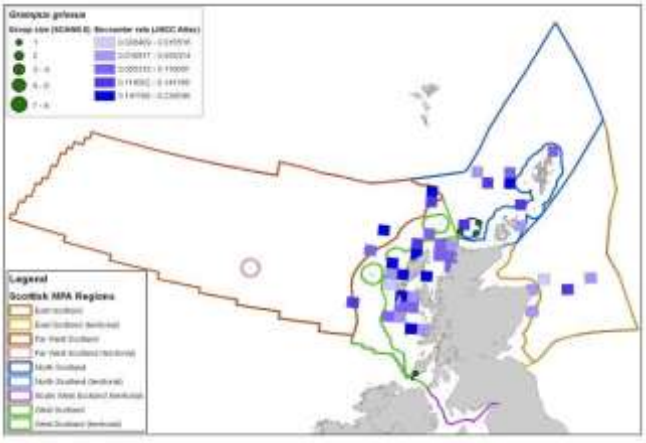
Natural heritage importance	Information sources
Scottish Biodiversity List	JNCC Cetacean Atlas
CITES Appendix I	MarLIN
EC Habitats Directive Annex II, IV & V	SMRU Ltd.
Fisheries Act 1981	WDCS Species Guide
IUCN Red List (Least concern)	
UK BAP	
Wildlife and Countryside Act 1981	

Common name - *Scientific name*	Species group
RISSO'S DOLPHIN - *GRAMPUS GRISEUS*	**Whales, dolphins and porpoises**
Other name(s) - none	***Recent synonym*** - none

Image

Image: P. Evans / Seawatch Foundation

Distribution



Feature description

Characteristics - Unlike other dolphin species, this species has a blunt, squarish head and no discernable beak. Individuals can reach up to 3.8m in length, live for more than 30 years and reach breeding age at between 8-10 years (females) and 10-12 years (males). Colour patterns change dramatically with age. Younger calves are a much darker shade of grey than adults. Risso's dolphins tend to be found in groups of up to 12 individuals but can form large schools, and are often seen with other species e.g. bottlenose dolphin.

Habitat - Occur in areas of open coast, straits/sounds, sea lochs and offshore. They have an apparent preference for steep seabed habitats, e.g. the edge of the continental shelf between 400-1000m deep.

Feeding - Feed primarily on cephalopods (octopus, cuttlefish and squid) but will also take a variety of small fish species. Feeding appears to occur primarily at night.

Scottish distribution - Most sightings are from western Scotland, mainly the waters surrounding the Outer Hebrides. There are a few sightings around Shetland, Orkney, and off the east coast of the Scottish mainland.

Wider distribution - Risso's dolphins are widely distributed from the tropics to temperate regions in both the northern and southern hemisphere on the continental slope and outer shelf.

Feature status - Risso's dolphins are particularly sensitive to noise disturbance (e.g. from shipping, oil and gas operations and offshore development), dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch.

Natural heritage importance	Information sources
ASCOBANS	JNCC Cetacean Atlas
CITES Appendix I	MarLIN
EC Habitats Directive Annex II, IV & V	SMRU Ltd.
Fisheries Act 1981	WDCS Species Guide
IUCN Red List (Least concern)	
Scottish Biodiversity List	
UK BAP	
Wildlife and Countryside Act 1981	

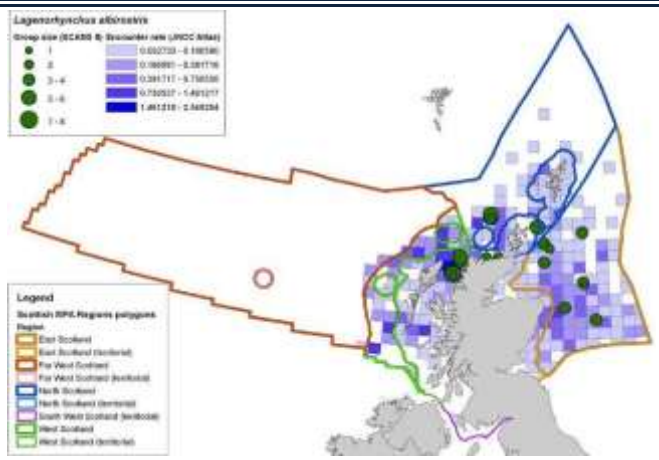
MOBILE SPECIES	TERRITORIAL WATERS

Common name - *Scientific name*	Species group
WHITE-BEAKED DOLPHIN - *LAGENORHYNCHUS ALBIROSTRIS*	**Whales, dolphins and porpoises**
Other name(s) - none	***Recent synonym*** - none

Image

Image: P. Evans / Seawatch Foundation

Distribution



Feature description

Characteristics - This dolphin is black to dark grey on its upper sides and back with a white to light grey belly and beak. They can grow up to 3.1m in length, live for at least 30 years and reach breeding age at 9 years (females) and 12 years (males). An acrobatic species, often seen breaching and riding the bow waves of boats. They frequently occur in mixed groups of fewer than 30 individuals with other species, such as Atlantic white-sided and bottlenose dolphins.

Habitat - Occur in cold temperate and subarctic waters, in open coastal areas, straits/sounds, sea lochs and offshore. They appear to have a general preference for waters shallower than 200m and those overlying the margins of the continental shelf.

Feeding - Feeds on small pelagic fish (e.g. herring and haddock), crustaceans, squid and octopus. They have been observed feeding co-operatively, herding schools of fish together and trapping them against the surface.

Scottish distribution - Abundant in all Scottish waters but concentrated around the Hebrides, Orkney and Shetland.

Wider distribution - The main concentrations of the UK population are found around Scotland, but high abundances have been recorded off the Atlantic coast of Ireland and they may be present throughout all UK offshore waters. Found across the North Atlantic.

Feature status - White-beaked dolphins are particularly sensitive to noise disturbance (e.g. from shipping, oil and gas operations and offshore development), dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch. Dedicated hunts for white-beaked dolphin still occur.

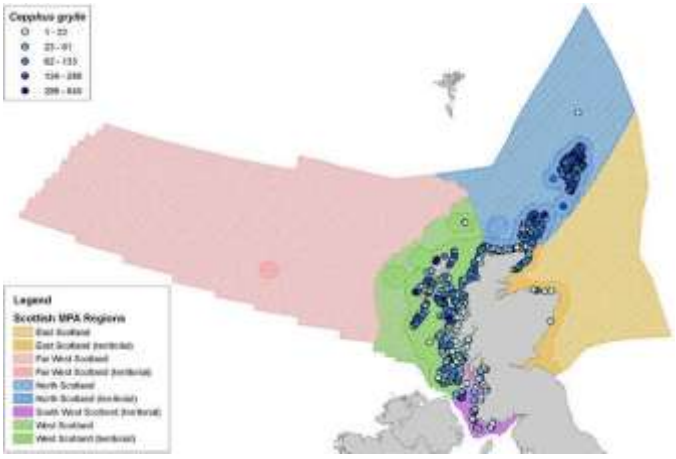
Natural heritage importance	Information sources
ASCOBANS	SMRU Ltd.
CITES Appendix I	MarLIN
EC Habitats Directive Annex II, IV & V	JNCC Cetacean Atlas
Fisheries Act 1981	WDCS Species Guide
IUCN Red List (Least concern)	
Scottish Biodiversity List	
UK BAP	
Wildlife and Countryside Act 1981	

MOBILE SPECIES	TERRITORIAL WATERS
Common name - *Scientific name*	**Species group**
BLACK GUILLEMOT - *CEPPHUS GRYLLE*	**Bird (auks)**
Other name(s) - Tystie (Shetland dialect)	***Recent synonym*** - none

Image

Image: Lorne Gill

Distribution



Feature description

Characteristics - Black guillemots are members of the auk family, having a breeding plumage that is all black with prominent white wing patches. In winter they moult into a grey & white plumage. Black guillemots are a resident, non-migratory species that generally remain close inshore. Unlike other auks they can lay two eggs.

Habitat - Black guillemots breed along cliffs and on offshore islands, generally under boulders or in rock crevices. Feeding occurs close inshore, generally in kelp forests, less than 2km offshore and in waters of <40m depth.

Feeding - Their main prey are small inshore fish, especially sandeels and butterfish as well as a wide range of invertebrates. The latter may be a more important dietary component in winter.

Scottish distribution - Black guillemots are widely distributed around the Scottish coast though the main concentrations are found in the Northern Isles and on the west coast. Over 50% of the estimated Scottish population of ~38000 (1998-2002), breeds in Shetland & Orkney. Birds also breed around the coast of Ireland, though as 87% of the Britain & Ireland population is located in Scotland, Ireland's black guillemot numbers are small.

Wider distribution - Globally, a widespread species found throughout Arctic waters on the northern coasts of Russia, Alaska (USA), Canada and Norway, in the Atlantic Ocean off Greenland (to Denmark), eastern Canada and as far south as the North and Baltic Seas.

Feature status - In Britain and Ireland, the species' range appears to have remained unchanged, but the pattern of population change differs across the country, with increases in Shetland, contrasting with decreases recorded elsewhere. Uncertainties in population status arise in part because black guillemots are hard to census - for much of time they are either at the nest, or at sea, fishing. Census counts rely on pre-breeding surveys when birds generally sit on the water near breeding cliffs. Black guillemots are highly sensitive to oil spills, but also to nest predators such as otters and American mink. Local declines have been ascribed to such predators in a number of areas, and where predators exist, black guillemot will often nest in inaccessible parts of the habitat.

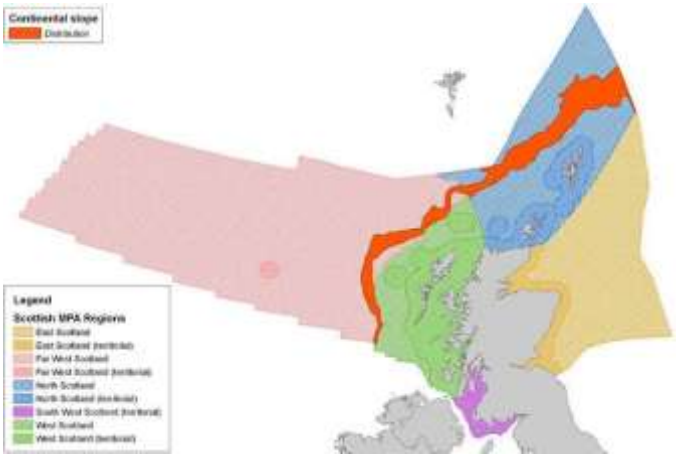
Natural heritage importance	Information sources
Scottish Biodiversity List	BirdLife International Seabird populations of Britain & Ireland (Mitchell *et al*. 2004)

Large-scale feature

CONTINENTAL SLOPE

Image

Distribution



Feature description

Characteristics - The continental slope is a geological feature which divides the shelf sea and deep ocean ecosystem. It is largely regarded as a stratified environment, with environmental factors such as light penetration, temperature, and current speed variable with depth (which exends down to 3000m at its maximum) and slope gradient (which ranges from less than 0.1 degrees to 14 degrees). As such, the continental slope represents an area of ecological and oceanopgrahic significance where a wide range of species may be found.

Ecological significance - The North Atlantic Current and Slope Current run across the continental slope, representing a potentially significant larval transport system. This may partly explain the high levels of associated biodiversity, with stratified communities of organisms able to exploit specific ecological niches. The heightened current speeds and hard substrata present in some areas provide ideal conditions for the settlement of suspension feeding benthic communities such as cold-water corals and sponges. In other areas the continental slope levels out, supporting the accumulation of sediment and development of communities typical of muds, sands and gravels. On the 1000m depth contour significant numbers of juvenille deep water fish such as orange roughy and blue ling are known to occur. Top predators including sharks and marine mammals occur at depths down to 1500m.

Component features - This large-scale feature encompasses not only the continental slope and the range of seabed habitats present but also the functional linkages to areas where primary and secondary production are affected, together with associated fish assemblages and top marine predators.

Scottish distribution - In Scotland the slope runs approximately NNE-SSW, falling away sharply from the Hebridean shelf sea ecosystem (generally less than 200m deep) into the Rockall Trough (1000-3000m deep).

Wider distribution - The continental slope extends around the UK continental shelf.

Information sources

Fisheries Research Services Internal Report No 02/08

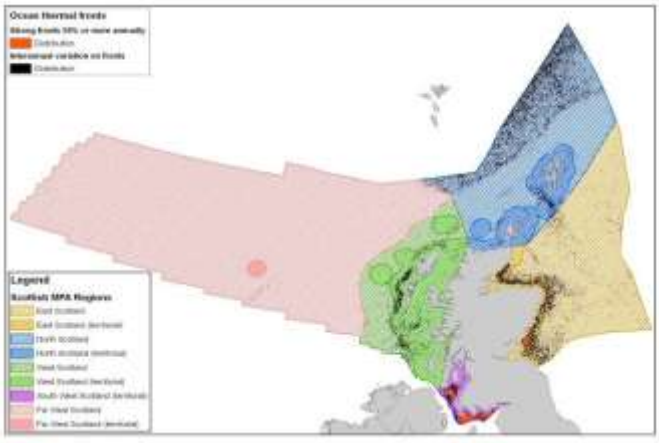
Large-scale feature

FRONTS AND OTHER HYDROGRAPHIC PROCESSES

Image

Image: Peter Evans / Seawatch Foundation

Distribution



Feature description

Characteristics - Fronts result from changes in temperature and/or salinity, causing a boundary to form between two or more water masses. Examples include when inshore waters mixed by tides meet thermally layered offshore waters, or when lower salinity coastal waters meet more saline oceanic waters (e.g. the Islay front) in relatively stable conditions. Other hydrographic processes may occur under a range of conditions, e.g. when oceanic currents impinge on topographic features such as seamounts, banks and mounds that give rise to internal waves, vortices and eddies.

Ecological significance - Mayprovide a localised supply of nutrients that stimulates the growth of planktonic organisms. This can lead to areas around or downstream of fronts and other hydrographic processes being highly productive, attracting a large number of plankton feeding fish (including basking shark), and hence predatory fish, seabirds, whales and dolphins. Other hydrographic processes taking place in the marine environment, such as residual current flows and hydraulic flows, may also be of ecological significance and there is work ongoing to consider the relevance of these to this large-scale MPA search feature category.

Component features - This large-scale feature encompasses areas of persistent fronts and other hydrographic processes including the underlying seabed habitats but primarily the functional linkages to areas where primary and secondary production are affected together with associated fish assemblages and top marine predators.

Scottish distribution - Persistent fronts occur to the south-east of Islay (the Islay Front), on the the west coast (Orkney-Shetland front), and the north-west (Aberdeen-Buchan front).

Wider distribution - Other fronts occur north and south of the Irish Sea, around the Isle of Man, west and east of the English Channel and in the southern North Sea.

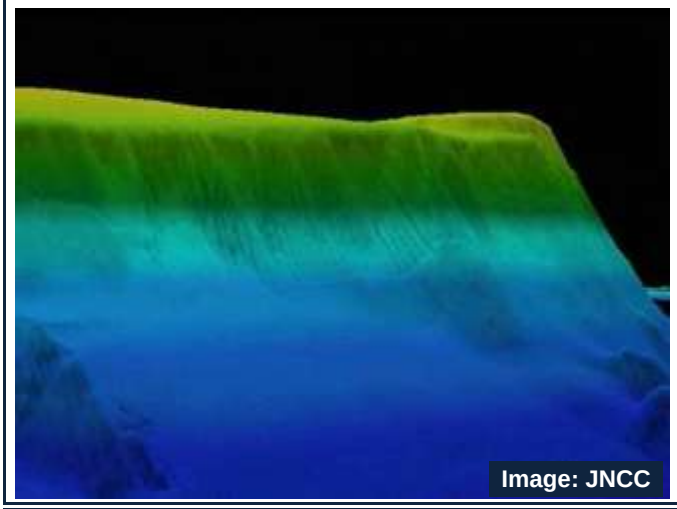
Information sources

DECC Offshore Strategic Environmental Assessments
Defra data layers - Task 2f pelagic biodiversity report

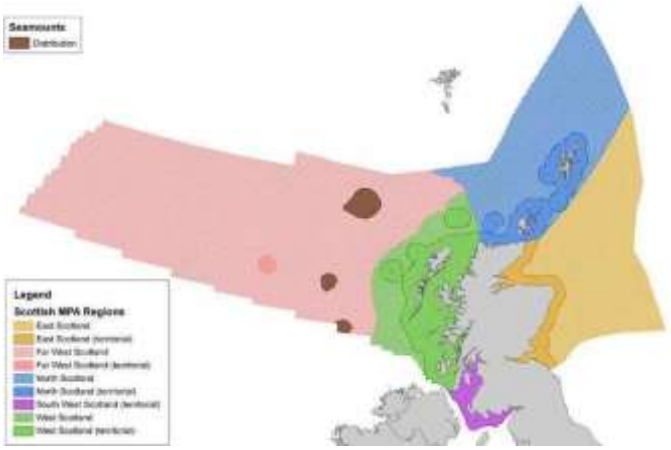
Large-scale feature

SEAMOUNTS

Image



Distribution



Feature description

Characteristics - Seamounts are undersea volcanic mountains that are generally conical in shape with a circular, elliptical or elongated base and a crest that rises more than 1000m above the surrounding seafloor, but does not break the sea surface.

Ecological significance - Their sheer size and relief has profound effects on oceanic circulation, trapping waves, jets and eddies. This in turn leads to high levels of primary and secondary production and ideal conditions for the settlement and growth of suspension feeding benthic communities such as cold-water corals and sponges. Concentrations of commercially important fish species, such as orange roughy, aggregate around seamounts and live in close association with the seabed communities. Aggregations of fish attract predators such as the bottlenose dolphin and a number of shark species.

Component features - This large-scale feature encompasses not only the seamounts and the full range of seabed habitats they support but also the functional linkages to areas where primary and secondary production are affected, together with associated fish assemblages and top marine predators.

Scottish distribution - Anton Dohrn, Rosemary Bank and Hebrides Terrace.

Wider distribution - More than 800 seamounts have been recorded across the North Atlantic. The majority are present along the Mid-Atlantic Ridge between Iceland and the Hayes fracture zone in the deep water off the coast of West Africa.

Information sources

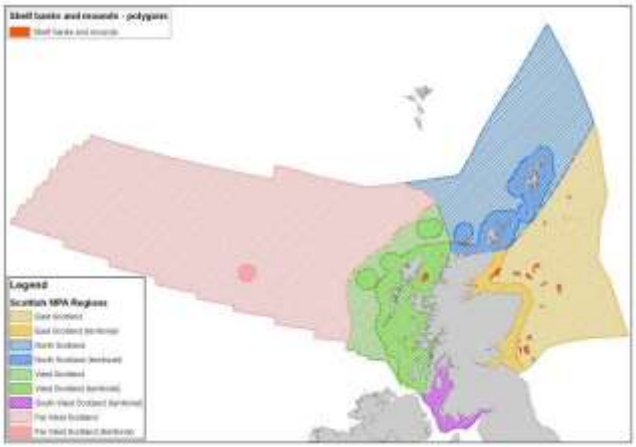
OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

Large-scale feature

SHELF BANKS AND MOUNDS

Image

Distribution



Feature description

Characteristics - Shelf banks and mounds are formed by the action of strong currents on mobile sediments (usually coarse sand and gravels). These large banks rise with a slope of greater than 2% from the seafloor of the continental shelf. Shelf banks and mounds cover approximately 2334 square kilometres of the UK continental shelf and, on the east coast, most lie within Scottish waters. This large-scale feature specifically excludes bedrock banks and pinnacles and sandbanks that are situated in waters shallower than ~20m. This is to avoid duplicating the protection of existing features which are listed as being of European importance under the EC Habitats Directive (Annex I 'reef' habitats and 'subtidal sandbanks' respectively).

Ecological significance - Shelf banks and mounds support seabed communities typical of coarse sediments, such as polychaetes, bivalves, and mobile crustaceans and are often important fish nursery, spawning and feeding areas. Many support commercial fisheries, e.g. the Wee Bankie and Marr Banks sandeel fishery. Top marine predators, ranging from other fish species to dolphins, porpoises and seabirds (e.g. guillemot, razorbill, puffin and kittiwakes) are closely associated with such areas.

Component features - This large-scale feature encompasses not only the shelf banks and mounds and their associated seabed habitats but also the functional linkages to areas where primary and secondary production are affected, together with associated fish assemblages and top marine predators.

Scottish distribution - Occur off all Scottish coasts e.g. the Shiant East Bank in the Minch, Nun, Whiten Head and Stormy Banks off the north coast, Dutch and Forty Mile Banks to the east of Shetland, the Smith Bank in the outer Moray Firth and the Marr, Berwick, and Scalp Bank together with the Wee Bankie in the south-east.

Wider distribution - Banks and mounds occur across the UK continental shelf.

Information sources

British Geological Survey
Brooks, A.J., Kenyon, N.H., Leslie, A., Long, D. & Gordon, J.E. (2012). Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters. *Scottish Natural Heritage Commissioned Report No.431*
DECC Offshore Strategic Environmental Assessments

Large-scale feature

SHELF DEEPS

Image

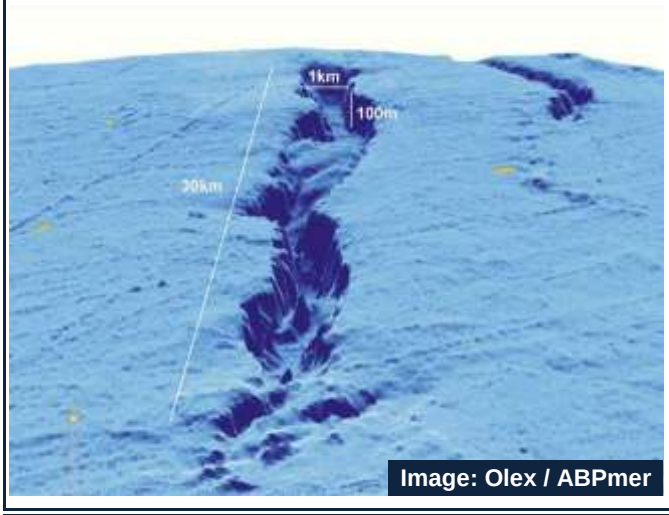
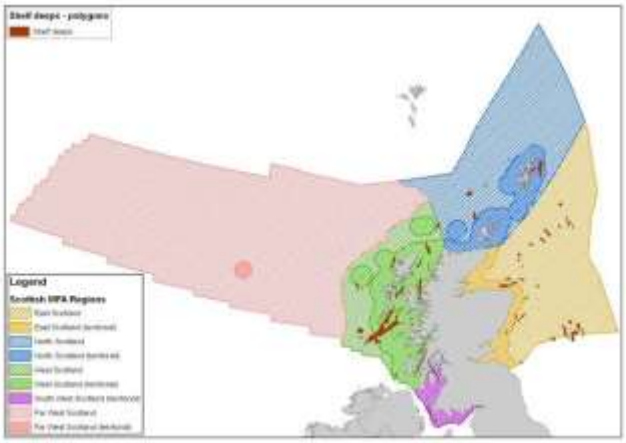


Image: Olex / ABPmer

Distribution



Feature description

Characteristics - Shelf deeps are elongated depressions in the seabed of the continental shelf in the form of channels, troughs, valleys or even canyons. They are formed by a range of processes including glacial erosion and tidal scour, the 'deeps', which remain unfilled or open, have a maximum water depth considerably greater than the surrounding seabed. They vary in depth and have a variety of forms for example Beaufort's Dyke is a tunnel valley 50km long by 1-4km wide and up to 312m deep.

Ecological significance - The bottom of the deeps may support a range of mixed sediment (mud, sand or gravel) communities including sea pens, burrowing sea anemones, sea cucumbers, starfish, brittlestars and polychaetes. In stronger currents where bedrock is exposed, or on the flanks of the canyon walls, deep water communities may occur, including cup and soft corals, sponges, encrusting sea mats, and feather stars. Whilst our knowledge of the ecological functioning of deeps is relatively limited (due to their inaccessible nature), we do know that their complex bathymetry often exerts localised influence on water movement creating small scale oceanographic features such as eddies and fronts which act to aggregate plankton and bring them closer to the surface. This in turn allows greater and consistent access to fish, seabirds and marine mammals (in some cases offering an insight into the persistent presence of top marine predators in some areas).

Component features - This large-scale feature encompasses not only the shelf deeps themselves and their associated seabed habitats but also the functional linkages to areas where primary and secondary production are affected, together with associated fish assemblages and top marine predators.

Scottish distribution - From the north Irish Sea (e.g. Beauforts Dyke and the Mull of Galloway Canyons), around the west coast (e.g. Stanton and Malin Deeps, Gulf of Corryvreckan, Inner Sound of Raasay), to Shetland, and south through the Fladen Deeps in the northern North Sea to the Southern Trench in the Moray Firth, the Buchan Deep and the Devil's Hole.

Wider distribution - Occur around the British Isles from the southern North Sea, English Channel and Irish Sea but with the greatest concentration in Scottish waters.

Information sources

DECC Offshore Strategic Environmental Assessments
Tetley, M. (2004). Minke whale habitat preference in the Southern Outer Moray Firth.
UKSeaMap Habitats (search feature is consistent with UK SeaMap 'shelf troughs')