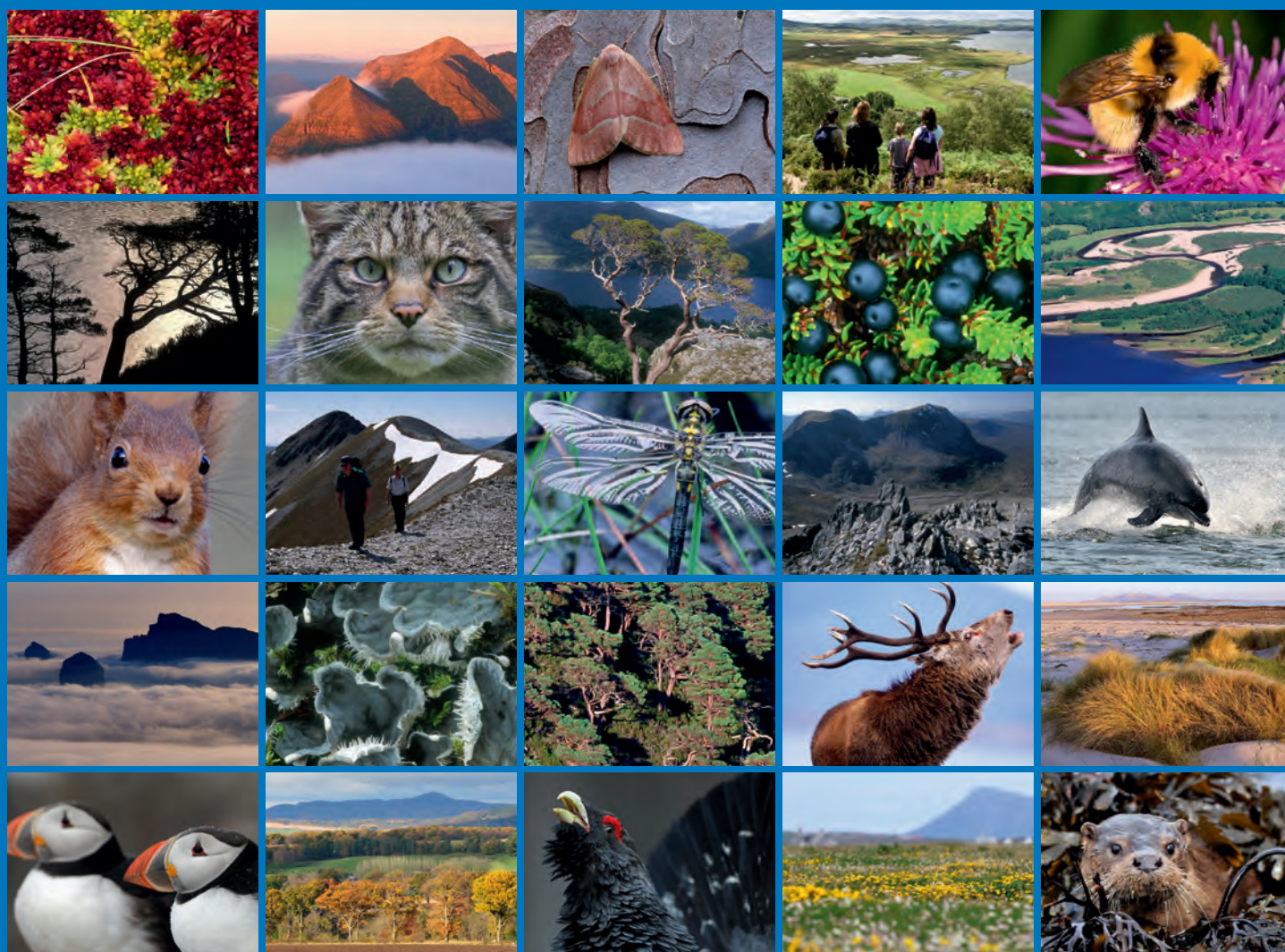


Descriptions of Scottish Priority Marine Features (PMFs)



COMMISSIONED REPORT

Commissioned Report No. 406

Descriptions of Scottish Priority Marine Features (PMFs)

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COMMISSIONED REPORT

Summary

Descriptions of Scottish Priority Marine Features (PMFs)

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Priority Marine Feature; catalogue; Scotland's seas; nature conservation.

Background

The seas around Scotland are rich and diverse – Scotland's position at the edge of the continental shelf, the long coastline, large area of sea and the mixing of warm and cold-water currents combine to make its waters a special place for marine wildlife and habitats. Scotland has over 18,000 km of coastline and its inshore and offshore areas are among the largest of any EU country, representing 13% of all European seas.

Scotland's seas are of outstanding scenic, historical and cultural value and are part of the national identity at home and abroad. The Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009 include new powers and duties to ensure that our seas are managed sustainably for future generations, integrating the economic growth of marine industries with the need to protect these assets. Measures to conserve Scotland's marine natural heritage are based on a three pillar approach, with action at the wider seas level (e.g. marine planning or sectoral controls); specific species conservation measures (e.g. improved protection for seals); and through site protection measures - the identification of new Marine Protected Areas (MPAs).

To help target action under each of the three pillars, Scottish Natural Heritage (SNH) and the Joint Nature Conservation Committee (JNCC) have generated a focused list of habitats and species of priority conservation importance - the Priority Marine Features (PMFs).

The aim of the current study was to produce a descriptive catalogue of the Scottish PMFs (including component habitats and species where appropriate) to serve as a reference for future nature conservation action. 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 was collated as part of the project and a summary map is provided in each description.

Main findings

- This project has generated a descriptive catalogue of the 81 PMFs that have been identified in the seas around Scotland (out to the limit of the UK continental shelf). The

list comprises 26 broad habitats (e.g. burrowed mud), seven low or limited mobility species (e.g. ocean quahog) and 48 mobile species, including fish (e.g. blue ling) and marine mammals (e.g. minke whale).

- Information on the distribution of the PMFs was collated within a Geographic Information System (GIS). This is the first time that data about such a diverse range of Scottish marine nature conservation interests have been compiled within a single repository. These data have and will be used in conjunction with other contextual base-mapping to inform the development of nature conservation advice and commentary (e.g. in the production of the Scotland's Marine Atlas - Baxter *et al.*, 2011).
- The feature distribution mapping used in the production of this report is being made available to view online via the National Marine Plan Interactive web portal (NMPi - <http://www.gov.scot/Topics/marine/seamanagement/nmpihome>). As new or refined data on Scottish PMFs become available, these will be fed into updates to the project geodatabase and NMPi.

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Table of Contents	Page
1. INTRODUCTION	1
1.1 Purpose of the work	1
2. METHODOLOGY	1
2.1 Origins of the Priority Marine Features	1
2.2 Development of the feature descriptions	1
2.2.1 Species descriptions	2
2.2.2 Habitat descriptions	3
2.2.3 Feature distribution mapping	3
3. RESULTS	4
4. BIBLIOGRAPHY	4
5. LIST OF SOURCES	7
6. GLOSSARY OF TECHNICAL TERMS	9
7. SCOTTISH PMF DESCRIPTIONS	19

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2A - Geological & geomorphological features

Acknowledgement - “Derived from a variety of sources of data including that provided by the British Geological Survey © NERC”

2B - Species layers

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2C - Habitat layers - (Subtidal mixed muddy sediments BGS, & Subtidal sands and gravels BGS)

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2C - Habitat layers - (Blue mussel beds, Carbonate mounds, Carbonate reefs, Cold water coral reef, Coral garden potential, Coral garden, Deep sea sponge aggregation potential, Estuarine rocky habitats, File shell beds, Fragile sponge anthozoan, Intertidal boulder communities, Intertidal mudflats, Intertidal *Mytilus edulis* beds, Maerl beds, *Modiolus modiolus* beds, *Ostrea edulis*, Saline lagoons, Sea pens and burrowing megafauna, Seagrass beds, Seamounts, Serpulid reefs)

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2C - Habitat layers - (Muds in deep water)

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2F - Marine diversity area - pelagic (front proxy)

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Map acknowledgements

The base map layers on which the distribution maps are based were provided under licence to SNH and to JNCC. The maps used as the basis for those reproduced in the descriptions were:

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The maps of ‘Coral gardens’, ‘Muds in deep water’, and ‘Deep sea sponge aggregations’ distribution layers are:

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In addition, the map layers for the Atlantic salmon, orange roughy and blue ling were provided by Marine Scotland. They bear the following acknowledgement:

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For the maps of mobile species for which bathymetric cut-offs were applied to derive their distributional range, the following acknowledgement applies:

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1. INTRODUCTION

The Scottish Government is committed to maintaining a healthy and biologically diverse marine and coastal environment that continues to provide economic, social and wider benefits to meet the long term needs of people and nature. The Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009 include new powers and duties to help deliver these aspirations. Under devolution agreements, Marine Scotland is now the lead on nature conservation matters in the waters adjacent to Scotland.

Marine nature conservation measures will be based on a three pillar approach, with action at the wider seas level (e.g. marine planning or sectoral controls); specific species conservation measures (e.g. improved protection for seals), and through site protection measures which will see the identification of new Marine Protected Areas (MPAs). Further details are provided in the *Strategy for Marine Nature Conservation in Scotland* (Marine Scotland, 2011a).

To help target marine nature conservation measures under each of the three pillars, Scottish Natural Heritage (SNH) and the Joint Nature Conservation Committee (JNCC) have generated a focused list of habitats and species of importance - the Priority Marine Features (PMFs).

1.1 Purpose of the work

The primary objective of this project was to produce a descriptive catalogue of PMFs (including component habitats and species) to serve as a reference source for future marine nature conservation action. 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. The collation of available information on the geographic distribution of the features was a key element of the project.

2. METHODOLOGY

2.1 Origins of the Priority Marine Features

The PMFs (see Annex A) were identified through a scientific evaluation of Scotland's known marine biodiversity interests (see Howson *et al.*, 2011; JNCC, 2011). Species and habitats on existing conservation lists were assessed against criteria that considered whether a significant proportion of their population occur in Scotland's seas, whether they are under threat or decline, and what functional role they play. All the features which have passed the criteria are considered important components of the biodiversity of Scottish seas. The list of PMFs reflects our current knowledge and understanding of marine habitats and species in Scotland's seas and may be updated in future, in light of periodic review of the best available evidence.

2.2 Development of the feature descriptions

The descriptions were designed to be concise overviews of the habitat or species in question. They were developed in liaison with SNH and JNCC staff, and are based on existing sources of more detailed information, to which they refer. The sources used are listed in Section 5. While technical terminology has been kept to a minimum, any specific terms are explained in the Glossary (Section 6).

The descriptions are subdivided into a number of standardised key terms and headings. The features have been assigned to the following three distinct categories:

- broad habitats (and their component biotopes and species);
- low or limited mobility species;
- mobile species.

The descriptions are further categorised according to the sea area within which the feature is considered to be of particular conservation importance:

- 'territorial waters';
- 'offshore waters'; or
- 'both' (territorial and offshore waters).

2.2.1 Species descriptions

The species descriptions were derived from the sources listed (see Section 5), with the characteristics, habitat requirements, and feeding habits based on MarLIN (Marine Life Information Network), FishBase, AlgaeBase, and other specialist sources.

Common names are provided where appropriate. These were compiled from a variety of catalogues of marine species, e.g. FishBase (Froese and Pauly, 2009), AlgaeBase (Guiry and Guiry, 2009), WoRMs (World Register of Marine Species - Appeltans *et al.*, 2009) as well as ID guides such as Collin's Guide to the Seashore (Hayward *et al.*, 1996). The most common vernacular name used in Scotland or the British Isles is given, together with other commonly used variations. The current accepted scientific name is also given, as listed by WoRMS.

Information on the distribution of the species in Scottish waters was determined from an analysis of the geodatabase compiled by the project (see Section 2.2.3). Information on the species' wider distribution around the rest of the British Isles, Europe and globally was derived from:

- MarLIN (MarLIN, 2009);
- JNCC and statutory agency databases;
- OSPAR Commission reports (Oslo and Paris Convention for the Protection of the Marine Environment of the North East Atlantic);
- NBN (National Biodiversity Network);
- OBIS (Ocean Biogeographic Information System); and
- WoRMS.

Specialist texts and species websites, e.g. AlgaeBase, FishBase and the Shark Trust, were also consulted. In addition, the distribution of fish species and their nursery and spawning areas, was derived from:

- Marine Scotland Science (formerly Fisheries Research Services, Aberdeen) reports and salmon and sea trout fisheries datasets;
- International Council for the Exploration of the Sea (ICES) reports and datasets;
- Defra-led MB0102¹ datalayers project - mobile species layers; and
- SEPA databases.

Information on the status of the feature in Scottish waters, UK waters and internationally, was based on Howson *et al.* (2011), together with:

¹ Project summary available at - http://randd.defra.gov.uk/Document.aspx?Document=MB0102_9538_TPS.pdf

- the Scottish Biodiversity List (Scottish Biodiversity Forum, 2009);
- UK BAP (UK Biodiversity Action Plan) priority species list (UK BAP, 2009);
- JNCC's current list of protected species;
- OSPAR list of threatened and declining species and habitats (OSPAR T&D) (OSPAR Commission, 2008);
- Lists of designated species under national legislation, European Directives and International Conventions;
- IUCN (International Union for the Conservation of Nature and Natural Resources) Red List (IUCN, 2009); and
- National Red Data Books.

2.2.2 *Habitat descriptions*

The habitat descriptions are subdivided into broad habitats and their component biotopes and species, as listed by Howson *et al.* (2011). The biotope names and details of any component biotopes were taken from the National Marine Habitat Classification (Connor *et al.*, 2004). The descriptions list all the component biotopes known to occur in Scottish waters.

The habitat and large-scale feature descriptions are based on the sources listed in Section 5. Information on broad habitats was augmented by reference to the MarLIN website, UK BAP and OSPAR habitat descriptions and the habitat reviews undertaken by the UK Marine SACs project (Jones *et al.*, 2000).

Information on the distribution of the relevant broad habitats or biotopes was taken from the project geodatabase (see Section 2.2.3 below). Information on the status of the feature in Scottish waters, UK waters and internationally, was based on Howson *et al.* (2011), together with the sources listed in Section 2.2.1.

2.2.3 *Feature distribution mapping*

The Defra data layers mapping products, which utilised existing SNH and JNCC survey records, played a fundamental role in the development of the Geodatabase of Marine features in Scotland (GeMS) - a key project deliverable. The initial Defra outputs were refined and supplemented with additional data, to meet specific Scottish requirements, primarily from the following repositories:

- NBN Marine Recorder database;
- MESH data layers; and
- DASSH (Archive for Marine Species and Habitats Data) data holdings.

The fish distribution mapping was based primarily on the mobile species data layer developed by Cefas for the Defra MB0102 project, with additional data from ICES. Additional data on the distribution of sharks and rays were supplied by the Shark Trust, with specific data on the common skate (*Dipturus batis* complex) courtesy of Glasgow Museums and the Orkney Skate Trust. Information on the deep water fish species, orange roughy and blue ling, was provided by Marine Scotland Science.

In addition, SNH supplied the project geodatabase with specific species survey data, e.g. for the fan mussel (*Atrina fragilis*). JNCC provided specialist GIS layers for offshore habitats, including submarine structures made by leaking gases, carbonate mounds, and coral gardens. The representation of offshore deep sea muds, offshore subtidal sands and gravels, and burrowed mud (in offshore waters) is based on version 7 of UKSeaMap2010 (McBreen *et al.*, 2011). Data on the current distribution of stoneworts were supplied by Dr Nick Stewart.

The feature maps were rendered in ESRI ArcGIS 10.0 using the European Albers Equal Areas Conic projection, with modified standard parallels (Standard Parallel 1 = 50.2; Standard Parallel 2 = 61.2). The geodatabase includes all relevant metadata, and holds the data points and polygons in the WGS84 projection.

The feature maps distinguish territorial and offshore waters. For distribution maps displaying habitat or species data as point records, territorial and offshore waters are shown in different shades of blue. In maps which include species polygon data, only the boundaries of territorial and offshore water are shown in blue. While all available feature distribution records are mapped, only those in the relevant sea area of conservation interest (i.e. territorial waters, offshore waters or both, see Section 2.2) are shown in colour, with the remaining records depicted in grey. The component biotopes and species of habitat PMFs are distinguished.

3. RESULTS

The PMF descriptions are presented in Section 7 of this report. They provide a concise snapshot of the main characteristics of each feature, together with key points about their importance to the biodiversity, culture, or economics of Scotland. They should not be regarded as comprehensive and readers are encouraged to look at the additional sources identified. While the feature distribution mapping presented in the report is correct at the time of publishing, as new or refined data on Scottish PMFs become available, these will be fed into updates to the project geodatabase and available to view online via the National Marine Plan Interactive web portal (NMPi). Readers are encouraged to refer to the NMPi for the latest available information and to enable examination of feature records at different resolutions. In addition, the marine expertise of SNH, JNCC or Marine Scotland Science staff should be consulted whenever appropriate.

4. BIBLIOGRAPHY

Appeltans, W., Bouchet, P., Boxshall G.A., Fauchald, K., Gordon, D.P., Hoeksema, B.W., Poore, G.C.B, van Soest, R.W.M., Stöhr, S., Walter, T.C. & Costello, M.J. eds. 2009. *World Register of Marine Species*. Available from <<http://www.marinespecies.org/>>

Charrier, G., Coombs, S.H., McQuinn, I.H. & Laroche, J. 2007. Genetic structure of whiting *Merlangius merlangus* in the Northeast Atlantic and adjacent waters. *Marine Ecology Progress Series*, **330**: 201-211.

Connor, D.W., Brazier, D.P., Hill, T.O. & Northen, K.O. 1997a. Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 1. Littoral biotopes. Version 97.06. Joint Nature Conservation Committee, Peterborough. *JNCC Report No. 229*.

Connor, D.W., Dalkin, M.J., Hill, T.O., Holt, R.H.F. & Sanderson, W.G. 1997b. Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 2. Sub-littoral biotopes. Version 97.06. Joint Nature Conservation Committee, Peterborough. *JNCC Report No. 230*.

Connor D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northen, K.O. & Reker, J.B. 2004. *The Marine Habitat Classification for Britain and Ireland Version 04.05*: Joint Nature Conservation Committee, Peterborough. ISBN: 1 861 07561 8 (internet version). Available from <<http://jncc.defra.gov.uk/MarineHabitatClassification>>

Foster-Smith, R., Benson, A. & Foster-Smith, J. 2009. Interpretation of Pobie Bank East of Shetland for Annex I Reef. *JNCC Report No. 433*.

Froese, R. & Pauly, D. eds. 2009. *FishBase*. Available from <<http://www.fishbase.org>>, version (10/2009).

GESAMP. 1983. Report of the Thirteenth Session, Geneva, Switzerland, 28. February-4 March 1983. IMO/FAO/UNESCO/WMO/WHO/IAEA/UN/UNEP Joint Group, of Experts on Scientific Aspects of Marine Pollution. Reports and Studies (18): 50p. WMO, Geneva, Switzerland.

Gibb, F.M., Gibb, I.M. & Wright, P.J. 2007. Isolation of Atlantic cod (*Gadus morhua*) nursery areas. *Marine Biology*, **151**: 1185-1194.

Green, E.P. & Short, F.T. 2003. *World Atlas of Seagrasses*. Prepared by the UNEP World Conservation Monitoring Centre. University of California Press, Berkeley, USA.

Guiry, M.D. & Guiry, G.M. 2009. *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. Available from <<http://www.algaebase.org>>; cited on 18 December 2009.

Hayward, P.J., Nelson-Smith, A. & Shields, C. 1996. *Collins pocket guide: sea shore of Britain and Europe*. Collins pocket guides. Harper-Collins Publishers: London. ISBN 0-00-219955-6. 352 pp.

Hiscock, K. 1990. *Marine Nature Conservation Review: methods*. Joint Nature Conservation Committee, Peterborough, Nature Conservancy Council, CSD Report, No. 1072. (Marine Nature Conservation Review Report, No. MNCR/OR/5.).

Hiscock, K. ed. 1996. *Marine Nature Conservation Review: rationale and methods*. Joint Nature Conservation Committee, Peterborough. (Coasts and seas of the United Kingdom. MNCR series).

Hislop, J.R.G., Gallego, A., Heath, M.R., Kennedy, F.M., Reeves, S.A., & Wright, P.J. 2001. A synthesis of the early life history of the anglerfish, *Lophius piscatorius* (Linnaeus, 1758) in northern British waters. *ICES Journal of Marine Science*, **58**: 70-86.

Howson, C.M., Steel, L., Carruthers, M. & Gillham, K. 2011. Identification of priority marine features in Scottish territorial waters. *Scottish Natural Heritage Commissioned Report No. 388*.

Iglesias, S.P., Toulhout, L. & Sellos, D.Y. 2010. Taxonomic confusion and market mislabelling of threatened skates: important consequences for their conservation status. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **20**: 319-333.

IUCN (International Union for Conservation of Nature). 2009. *IUCN Red List of Threatened Species. Version 2009.2*. Available from <<http://www.iucnredlist.org>>

Joint Nature Conservation Committee. 2011. *Priority marine features in Scottish offshore waters*. Joint Nature Conservation Committee, Peterborough.

Jones, L.A., Hiscock, K. & Connor, D.W. 2000. *Marine habitat reviews. A summary of ecological requirements and sensitivity characteristics for the conservation and management of marine SACs*. Peterborough, Joint Nature Conservation Committee. (UK Marine SACs

Project report). Available from <<http://www.ukmarinesac.org.uk/pdfs/marine-habitats-review.pdf>>

Laurenson, C.H., Johnson, A. & Priede, I.G. 2005. Movements and growth of monkfish *Lophius piscatorius* tagged at the Shetland Islands, northeastern Atlantic. *Fisheries Research*, **71**(2): 185-195.

Lincoln, R., Boxshall, G. & Clark, P. 1998. *A dictionary of ecology, evolution and systematics*, 2nd ed. Cambridge: Cambridge University of Press.

Marine Scotland. 2011a. *A Strategy for Marine Nature Conservation in Scotland*. Available from <<http://www.scotland.gov.uk/marinescotland/mncstrategy>>

Marine Scotland. 2011b. *Marine Protected Areas in the Seas around Scotland. Guidelines on the selection of MPAs and development of the MPA network*. Available from <<http://www.scotland.gov.uk/marinescotland/mpaguidelines>>

MarLIN (Marine Life Information Network). 2009. *Biology and Sensitivity Key Information Reviews. Marine Life Information Network*. Marine Biological Association of the United Kingdom, Plymouth. Available from <<http://www.marlin.ac.uk/>>

McBreen, F., Askew, N., Cameron, A., Connor, D., Ellwood, H. & Carter, A. 2011. UKSeaMap 2010: Predictive mapping of seabed habitats in UK waters. *JNCC Report*, No. 446. Available from <<http://jncc.defra.gov.uk/ukseamap>>

Moore, C.G. & Roberts, J.M. 2011. An assessment of the conservation importance of species and habitats identified during a series of recent research cruises around Scotland. *Scottish Natural Heritage Commissioned Report No. 446*.

Nature Conservancy Council. 1984. *Nature conservation in Great Britain*. Shrewsbury: Nature Conservancy Council.

Neat, F.C., Wright, P.J., Zuur, A.F., Gibb, I.M., Gibb, F.M., Tulett, D., Righton, D.A. & Turner, R.J. 2006. Residency and depth movements of a coastal group of Atlantic cod (*Gadus morhua* L.). *Marine Biology*, **148**: 643-654.

OED (2nd edn revised). 2005. *Oxford Dictionary of English*. Oxford: Oxford University Press.

OSPAR Commission. 2008. *Case Reports for the OSPAR List of Threatened and/or Declining Species and Habitats*. OSPAR Commission. Biodiversity Series. Available from <<http://www.ospar.org/documents?v=7099>>

Paxton, C.G.M., Scott-Hayward, L.A.S. & Rexstad, E. 2014. Statistical approaches to aid the identification of Marine Protected Areas for minke whale, Risso's dolphin, white-beaked dolphin and basking shark. *Scottish Natural Heritage Commissioned Report No. 594*. Available from <http://www.snh.org.uk/pdfs/publications/commissioned_reports/594.pdf>

Scottish Biodiversity Forum. 2009. *Biodiversity Scotland*. Available from <<http://www.biodiversityscotland.gov.uk/>>

Tobin, D., Wright, P.J. & O'Sullivan, M. 2010. Timing of the maturation transition in haddock *Melanorammus aeglefinus*. *Journal of Fish Biology*, **77**: 1252-1267.

UK Marine SACs Project. 2001. *Overview of dynamic and sensitivity characteristics for conservation management of marine SACs*. Marine Communities Reports. Available from <<http://www.ukmarinesac.org.uk/publications.htm>>

UK BAP (UK Biodiversity Action Plans). 2009. *UK Biodiversity Action Plan Habitat Descriptions*. Joint Nature Conservation Committee, Peterborough. Available from <<http://www.ukbap.org.uk>>

University Marine Biological Station, Millport. 2007. Conservation of the Native Oyster *Ostrea edulis* in Scotland. *Scottish Natural Heritage Commissioned Report No. 251* (ROAME No. F02AA408).

Wright, P.J., Galley, E., Gibb, I.M. & Neat, F.C. 2006a. Fidelity of adult cod to spawning grounds in Scottish waters. *Fisheries Research*, **77**:148-158.

Wright, P.J., Neat, F.C., Gibb, F.M., Gibb, I.M. & Thordarson, H. 2006. Evidence for metapopulation structuring in cod from the west of Scotland and North Sea. *Journal of Fish Biology*, **69**:181-199.

5. LIST OF SOURCES

The following additional sources were used in the production of the PMF descriptions -

Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas (ASCOBANS): <http://www.ascobans.org/>

Atlantic Salmon Trust: <http://www.atlanticsalmontrust.org/>

Argyll and Bute Council: <https://www.argyll-bute.gov.uk/environment>

ARKive: <http://www.arkive.org/>

BirdLife International: http://www.birdlife.org/news/features/2005/01/north_sea_seabirds.html

Buglife: <https://www.buglife.org.uk/advice-and-publications/advice-on-managing-bap-habitats/saline-lagoons>

Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) Appendices: <http://www.cites.org/eng/app/index.shtml>

Conchological Society: <http://www.conchsoc.org/>

Encyclopedia of Life: <http://www.eol.org/pages/493164>

Encyclopedia of Marine Life: <http://www.habitas.org.uk/marinelife/>

FAO (Food and Agriculture Organisation of the United Nations) Species Fact Sheets: <http://www.fao.org/fishery/species/search/en>

Marine Scotland: <http://www.gov.scot/About/People/Directorates/marinescotland>

Hexacorallians of the World: <http://hercules.kgs.ku.edu/hexacoral/anemone2/index.cfm>

International Council for the Exploration of the Sea (ICES) ICES-FishMap: <http://www.ices.dk/marine-data/maps/Pages/ICES-FishMap.aspx>

International Otter Survival Fund: <http://www.otter.org/otterSpecies.aspx>

JNCC (Joint Nature Conservation Committee): <http://www.jncc.gov.uk/page-3>

JNCC Atlas of Cetacean distribution in north-west European waters: <http://www.jncc.gov.uk/page-2713>

JNCC Species Conservation Designations: <http://www.jncc.gov.uk/page-3408>

Mar-Eco: <http://www.mar-eco.no/>

Marine Species Identification Portal: <http://species-identification.org/>

MarineBio: <http://www.marinebio.com/>
Marine Scotland: <http://www.gov.scot/Topics/marine>
MarLIN (Marine Life Information Network): <http://www.marlin.ac.uk/>
MCS (Marine Conservation Society) Fish online: <http://www.fishonline.org/>
North Atlantic Killer Whale ID (NAKID) Project:
<http://www.northatlantickillerwhales.com/index.asp>
National Biodiversity Network: <http://www.searchnbn.net/>
NMW (National Museum Wales) - Marine Bivalve Shells of the British Isles:
<http://naturalhistory.museumwales.ac.uk/britishbivalves/home.php>
NOAA NMFS (National Marine Fisheries Services):
<http://www.nefsc.noaa.gov/publications/tm/tm148/tm148.pdf>
Natural England - advice on otters:
<http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/otters.aspx>
OSPAR Commission List of Threatened and Declining Species and Habitats (OSPAR T&D):
<http://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats>
OSPAR Case Reports for the List of Threatened and Declining Species and Habitats:
<http://www.ospar.org/documents?v=7099>
PlantLife: <http://www.plantlife.org.uk/>
RSPB (Royal Society for the Protection of Birds):
<http://www.rspb.org.uk/climate/wildlife/seabirds/orkney.asp>
Scottish Association for Marine Science: <http://www.sams.ac.uk/>
Scottish Biodiversity List: <http://www.biodiversityscotland.gov.uk/advice-and-resources/scottish-biodiversity-list/>
Scottish Environment LINK: <http://www.scotlink.org/>
Sea Mammal Research Unit (SMRU) Ltd: <http://www.smru.co.uk/>
SMRU Advice Unit and Special Committee on Seals (SCOS): <http://www.smru.st-andrews.ac.uk/pageset.aspx?psr=411>
Shark Trust: <http://www.sharktrust.org/>
SNH (Scottish Natural Heritage): <http://www.snh.org.uk/>
SNH - Information Note Series: <http://www.snh.gov.uk/docs/A1794619.pdf>
SNH - Otters and development: <http://www.snh.org.uk/publications/on-line/wildlife/otters/default.asp>
SNH - Stoneworts: <http://www.snh.org.uk/publications/on-line/naturallyscottish/stoneworts/default.asp>
SNH - Scottish Lagoons:
<http://www.snh.org.uk/pdfs/publications/marine/ScottishLagoons.pdf>
Solent Forum: <http://www.solentforum.org/resources/pdf/natconsv/salinelagoons.pdf>
The Scottish Sea Angling Conservation Network: <http://www.ssacn.org/>
UK Biodiversity Action Plans (UK BAP): www.ukbap.org.uk
UK BAP Priority Habitat Descriptions:
<http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsRevised20100730.pdf>
WoRMS (World Register of Marine Species): <http://www.marinespecies.org/>
WWF-UK Marine Health Check: http://assets.wwf.org.uk/downloads/mhc_2009_final.pdf

6. GLOSSARY OF TECHNICAL TERMS

The terms given here are defined in detail on the MarLIN website (www.marlin.ac.uk).

Aggregation - a group of individuals of the same species living closely together, but not physically connected (cf. '**colony**').

Amphipods - a group of crustaceans recognised by their laterally compressed bodies and numerous leg-like appendages (OED, 2005).

Antenna (pl. **Antennae**) - a long pair of sensory appendages on the heads of insects and crustaceans.

Aquaculture - the cultivation of aquatic organisms by humans for commercial purposes. The cultivation of **marine** organisms in sea water is also called 'mariculture'.

Barbel - a fleshy filament growing from the mouth or snout of a fish.

Barnacle - a marine crustacean with a hard, calcareous external shell that lives permanently attached to a surface and filter feeds using modified feathery legs.

Bedrock - any stable hard substratum.

Biodiversity - the variety of plants and animals within a particular habitat, between species or of ecosystems.

Biogenic reef - a type of reef where the raised structure is created by animals (e.g. mussel beds and tube-worm reefs), rather than by rock.

Biotope - "the habitat (i.e. the environment's physical and chemical characteristics) together with its recurring associated community of species operating together at a particular scale" (Connor *et al.*, 1997a&b).

Biotope complex - groups of **biotopes** with similar overall character (e.g. **seagrass** beds, rockpools, dense **furoids**) (Connor *et al.*, 1997a&b).

Bivalve - a **mollusc** with a shell comprising two hinged **calcareous** valves, e.g. mussels, clams and cockles.

Brackish - a mixture of fresh water and sea water, these 'salty' waters can vary between slightly marine and slightly fresh in character.

Bristleworm - worms with bristles which belong to the group Polychaeta, which means 'many bristles'.

Brittlestar - the common name for members of the group Ophiuroidea. Brittlestars are related to starfish but recognized by their thin, extremely long and articulate arms, which (as the name suggests) break very easily.

Broad habitat - in the context of this report, the term broad habitat has been used to describe PMFs which comprise of one or more biotopes and/ or species components.

Bryozoan - **sessile** colonies made up of many individual invertebrates ca 0.5 mm long called zooids. Commonly they are referred to as **sea mats**, **horn wracks** or **lace corals**.

Colonies have a wide variety of forms, including encrusting sheets or mats, soft fleshy lobes, erect twiggy growths, or bushy tufts.

Calcareous - containing calcium carbonate, chalky.

Circalittoral - the **subtidal** zone which is dominated by animals and located below the **infralittoral**, see also **intertidal and subtidal zones**.

Cnidaria - the group of animals which include **sea anemones**, corals, sea pens, jellyfish and **hydroids**. They characteristically possess a cnidocyte, or stinging cell, typically used to capture prey.

Cnidarian - a member of the large group of aquatic animals called **Cnidaria**

Colony (adv. **Colonial**) - 1) a group of organisms of the same species living connected together in a common mass or 2) a group of organisms connected by behavioural or sociological factors (e.g. seabird **colony**, seal **colony**).

Community - a group of organisms occurring in a particular environment, presumably interacting with each other and with the environment.

Conservation - "the regulation of human use of the global ecosystem to sustain its **diversity** of content indefinitely" (Nature Conservancy Council, 1984).

Continental shelf - the sea bed adjacent to a continent to depths of around 200 m, or where the **continental slope** drops steeply to the ocean floor.

Continental slope - the area of sea bed that drops steeply to the ocean floor. It lies offshore of the **continental shelf**.

Coralline - relating to, or resembling, coral, especially any **calcareous** red alga impregnated with calcium carbonate.

Cryptic - 1) an animal which lives in hidden places, such as crevices, caves or beneath stones, or 2) an organism whose appearance or colouration makes it difficult to see or recognise.

Demersal - living at or near the bottom of a sea or lake but having the ability of active swimming.

Deposit feeder - any organism that feeds on fragmented particulate organic matter in or on the substratum; also known as detritivores.

Detritus - fragmented particulate organic matter, derived from the decomposition of plant and animal remains.

Diatoms - single celled **phytoplankton** whose cell walls are made of silica. **Diatoms** show a **diversity** in cell forms.

Diversity - the state or quality of being different or varied. In species, the degree to which the total number of individual organisms in a given ecosystem, area, **community** or trophic level is divided evenly over different species. In **conservation** assessment, an assessment of the **richness** of different types in a location (which can be large or small) includes the number of different **biotopes** and numbers of species. The number of species present in an example of a particular **biotope**.

Dredge - 1) the action of removing material from the sea bed, or 2) bottom sampling equipment towed along the sea bed for collecting benthic **sediment** and organisms, or 3) a specific type of bottom trawl used for the commercial collection of benthic organisms, e.g. scallops, or of **sediment** and may be a suction or hydraulic device.

Echinodermata - a large group of **marine** animals which include sea urchins, starfish, brittlestars, feather stars and sea cucumbers and whose name is derived from the Greek for 'spiny skin'.

Ecology - the study of the inter-relationships between living organisms and their **environment** (from Lincoln *et al.*, 1998).

Embayment - a type of **marine inlet** typically where the line of the coast follows a concave sweep between rocky headlands, sometimes with only a narrow entrance to the embayment.

Epifauna - benthic animals which live on the surface of the sea bed, or on the surface of a submerged substrate.

Estuary (pl. **Estuaries**) - the tidal mouth of a river, where the river meets the sea and within which sea water is measurably diluted by fresh water.

Extremely exposed - of **wave exposure** - open coastlines which face into the prevailing wind and receive both wind-driven waves and oceanic swell, without any offshore obstructions such as islands or shallows, for several thousand kilometres and where deep water is close to the shore (50 m depth contour within about 300 m).

Extremely sheltered - of **wave exposure** - fully enclosed coasts with a fetch of no more than about 3 km.

Fauna - the animal life of a given region, **habitat** or geological period.

Fetch - distance over which a wind acts to produce waves

Filamentous - composed of fine threads or fibres.

Filter-feeder - see '**suspension-feeder**'.

Fiord - see '**fjord**'.

Firth - a lengthy arm of the sea in Scotland.

Fjard - an inlet formed by the submergence of a glacial valley in areas of low topography. They are typically shorter, shallower and wider than **Fjords**.

Fjord - a long, narrow-sided inlet of the sea having a shallow entrance sill. **Fjords** are glacially deepened and may have a series of sills and basins, often with deep water at the head. They are commonly surrounded by high ground and in cross-section, have a deep 'U'-shape.

Flora - the plants or plant life of a particular region, **habitat** or geological period.

Foliose - bearing leaves or leaf-like structures or having the appearance of a leaf.

Froned - a leaf-like structure formed by the fusion of the stem and foliage in flowerless plants. In seaweeds, the leaf-like or erect part of the tissue.

Furoid algae - any brown seaweed which belongs to the Family Fucaceae, e.g. toothed wrack *Fucus serratus*.

Gravel - **sediment** particles 4-16 mm in diameter, which may be formed from rock, shell fragments or **maerl**.

Grazers - animals which rasp benthic algae, seaweeds or **sessile** animals (such as **sea mats**) from the substratum.

Habitat - the place in which a plant or animal lives. In the **marine** environment it is defined according to geographical location, physiographic features and the physical and chemical environment (including **salinity**, wave exposure, strength of tidal streams, geology, biological zone, **substratum**, 'features' (e.g. crevices, overhangs, rockpools) and 'modifiers' (e.g. sand-scour, wave-surge, **substratum** mobility).

Hermit crab - a small lobster-like crustacean which inhabits the empty shells of other animals.

Holdfast - the structure that anchors macroalgae to the **substratum**, and which resembles a collection of roots but does not gather nutrients.

Hydroid - a general term for members of the **cnidarian** Class Hydrozoa, and includes 'sea firs' and 'white weeds'.

ICES - the International Council for the Exploration of the Sea (ICES) coordinates and promotes marine research on oceanography, the marine environment, the marine ecosystem, and on living marine resources in the North Atlantic. ICES is a network of more than 1600 scientists from 200 institutes linked by an intergovernmental agreement (the ICES Convention) to add value to national research efforts.

Infauna - benthic animals which live within the sea bed. See also Figure 1.

Infralittoral - the **subtidal** zone dominated by algae and located below the **intertidal**, see also **intertidal and subtidal zones**.

Intertidal - the zone between the highest and lowest tides.

Intertidal and subtidal zones - the **intertidal (littoral)** and **subtidal (sublittoral)** is divided into a number of zones or areas, and shown on Figure 1.

Introduced species - any species which has been introduced directly or indirectly by human agency (deliberate or otherwise), to an area where it has not occurred in historical times and which is separate from and lies outside the area where natural range extension could be expected (i.e. outside its natural geographical range).

Irish Sea - the area of sea between Great Britain and Ireland north of a line across St. George's Channel from St Anne's Head to Carnsore Point in the south, and south of a line across the North Channel from Mull of Kintyre to Fair Head in the north, including all **estuaries** except the **Firth** of Clyde.

Juvenile - the life stage between the larval stage and the adult stage, characterised by the absence of reproductive ability.

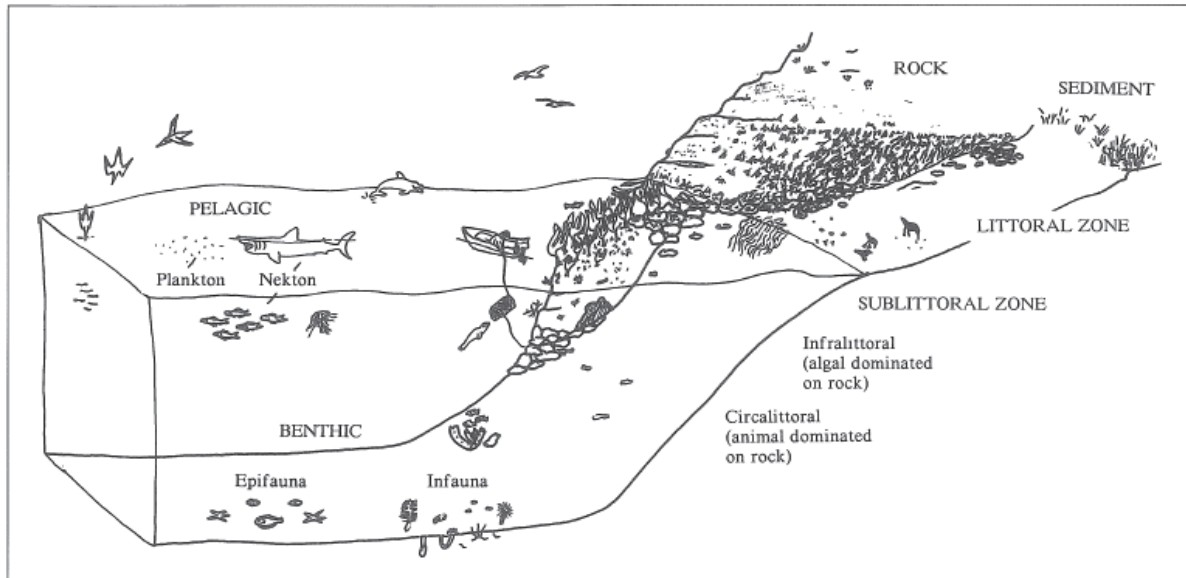


Figure 1. Marine ecosystems diagram, reproduced from drawing by Keith Hiscock in Hiscock, K. (ed.) (1996). Copyright JNCC.

Kelp - a group of large brown algae of the Order Laminariales, e.g. sugar kelp and oarweed, common in the **sublittoral fringe** and **infralittoral** zone (q.v.).

Kelp forest - a belt of the upper **infralittoral** on hard **substrata**, dominated by **kelps** (Laminariales) sufficiently dense to form an almost continuous canopy.

Kelp park - a belt of the lower **infralittoral** on hard **substrata**, which has scattered **kelps** (Laminariales) whose fronds do not meet to form a dense canopy.

Lagoon (saline) - a shallow body of coastal salt water (from **brackish** to hypersaline) partially separated from an adjacent sea by a barrier of **sand** or other **sediment**, or less frequently, by rocks.

Larva - (plural larvae) is a distinct juvenile form many animals undergo before turning into adults.

Littoral - see **intertidal and subtidal zones**.

Littoral fringe - see **intertidal and subtidal zones**.

Loch - (Scottish) a lake. In its widest sense, it is an open, enclosed or partially enclosed body of water. See also '**sea loch**'.

Lough - (Irish) see '**loch**'.

Low or limited mobility species - species which, in their adult phase, are attached to the substratum and do not move, or may have a limited ability to move small distances but are very closely associated with the substratum.

Lower shore - a physical term for the area of shore around low tide level, often applied where it is not possible to determine the biological subzone, for example on **sediment** shores (cf. '**sublittoral fringe**').

Maerl - twig-like unattached (free-living) **calcareous** red algae, often a mixture of species and including species which form a spiky cover on loose small stones - 'hedgehog stones'.

Marine - of the sea.

Marine inlet - term covers all forms of inlet, including **estuaries**, enclosed bays and the sounds, straits and narrows between land masses.

Megafauna - literally means 'large animals'.

Mobile species - species that can move freely through the water column or over the sea bed, and for which independent movement is an important part of their character.

Moderately exposed - of wave exposure - generally coasts facing away from prevailing winds and without a long fetch, but where strong winds can be frequent (from Hiscock, 1990).

Mollusc - the largest group of **marine** animals which includes snails, cuttlefish, squid, limpets and **bivalves**.

Mudflat - an expanse of **mud** or muddy **sediment** in the **intertidal** zone.

Mysid - slender, shrimp-like crustaceans with translucent bodies, feathery appendages, a broad tail fan and obvious eyes. A member of the Order **Mysida** (Phylum Arthropoda, Subphylum Crustacea).

Nekton - animals which are able to swim actively in the water column, moving about independently of water currents. See also Figure 1.

Niche - the ecological resource occupied by a species in a **community** or ecosystem.

Non-native (species) - a species that has been introduced directly or indirectly by human agency (deliberate or otherwise), to an area where it has not occurred in recent times (about 5,000 years BP) and which is separate from and lies outside the area where natural range extension could be expected (i.e. outside its natural geographical range).

Oligochaete - the most readily recognised members of the **oligochaetes** are probably the earthworms, the name means 'few bristles'. There are a few **marine** examples of **oligochaete** worms, such as sludge worms.

Omnivores - animals which feed on a mixed diet including plant and animal material.

Open coast - any part of the coast not within a **marine inlet**, strait or **lagoon**, including offshore rocks and small islands.

Parasite - an organism that lives in or on another living organism (the host), from which it obtains food and other requirements. The host does not benefit from the association and is usually harmed by it.

Pectoral - relating to the lower front or chest region of an animal.

Pelagic zone - the open sea and ocean, excluding the sea bottom. Pelagic organisms inhabit such open waters. See Figure 1.

Photosynthesis - the biochemical process that utilizes radiant energy from sunlight to synthesize carbohydrates from carbon dioxide and water in the presence of chlorophyll and other photopigments.

Phytoplankton - planktonic plant life: typically comprising suspended or motile microscopic algal cells such as **diatoms**.

Pinnate - branching like a feather - an elongate main axis with lateral branches or lobes.

Plankton - organisms which drift in the water column and have limited powers of locomotion in comparison with the water movements. Many benthic animals have **planktonic larvae** which act to disperse the species. See Figure 1.

Pollution (marine) - "The introduction by man, directly or indirectly, of substances or energy into the **marine environment** (including **estuaries**) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to **marine** activities including fishing, impairment of quality for use of sea water and reduction of amenities." GESAMP (1983).

Polychaeta - the Class **Polychaeta** (Phylum **Annelida**) are a group of truly segmented worms, characterised by extensions of each segment called 'parapodia' that bear bundles of bristles, hence the term 'many bristled' or 'poly' 'chaeta'. See **Bristleworm**.

Polychaete - a general term for members of the Class **Polychaeta** (Phylum **Annelida**).

Polyp - the **sessile** form of **cnidarians** which attaches to the **substratum** and can form large **colonies**. A **polyp** consists of a basal disc that attaches to a **substratum**, a cylindrical body which contains the gastrovascular cavity. The mouth located on the top of the **polyp**, is surrounded by numerous radiating tentacles.

Population - all individuals of one species occupying a defined area and usually isolated to some degree from other similar groups.

Potting - the setting of traps (pots) on the sea bed to fish for lobsters, crabs, etc. (see also 'creeling').

Rapids - strong tidal streams resulting from a constriction in the coastline at the entrance to, or within the length of, an enclosed body of water such as a **sea loch**. Depth is usually shallower than 5 m.

Ria - a drowned river valley in an area of high relief; most have resulted from the post-glacial rise in relative sea level.

Rockpool - a depression in the **littoral** zone of a rocky seashore where, during low tide, sea water is left behind.

Salinity - a measure of the concentration of dissolved salts in sea water.

Sand flat - an expanse of **sand** or sandy **sediment** in the **intertidal** zone.

Scavenger - any organism that feeds on dead (or dying) organic material.

Sea anemone - a type of **cnidarian** (Order Actiniaria, Phylum **Cnidaria**) with a large solitary **polyp**, consisting of a base, a column, and a ring of tentacles around a central mouth. So called due to their resemblance to flowers.

Sea cucumber - a common name for members of the Class Holothuroidea (Phylum **Echinodermata**), which refers to a group of 'cucumber' shaped **marine** organisms closely related to starfish and sea urchins.

Sea loch - in Scotland - an arm of the sea (**marine inlet**) entered by the tide (on each cycle), and fully marine waters. **Brackish** conditions may be established periodically, particularly in the surface layers of the water after heavy rainfall.

Sea urchin - common name for members of the Class Echinoidea (Phylum **Echinodermata**), characterised by a rigid test or shell, usually spherical or ovoid but occasionally flattened, and covered by mobile spines of varying length.

Seagrass - a flowering plant (Phylum Angiospermophyta) that is adapted to living fully submerged and rooted in estuarine and marine environments. Although not true grasses, all seagrasses are monocotyledons. The group is defined by their ecology rather than their taxonomy. In British waters, seagrasses are represented by the genus *Zostera* (eelgrass). Several members of the genus *Ruppia* (tasselweeds) also occur in marine and estuarine environments. *Ruppia* may be considered a seagrass, although this is not accepted universally (Green & Short, 2003).

Seamount - an undersea mountain.

Sessile - permanently attached to a **substratum**.

Sheltered - of **wave exposure** - coasts with a restricted fetch and/or open water window. Coasts can face prevailing winds but with a short fetch (<20 km) or extensive shallow area offshore, or may face away from prevailing winds (from Hiscock, 1990).

Soft coral - the common name for the Order Alcyonacea (Phylum **Cnidaria**), a group of solid fleshy bodied **colonial** corals in which the thick body tissue is strengthened with **calcareous** spicules.

Solitary - living alone, not gregarious.

Sound - Strictly, a sound is a wide expanse of water. The term may be used for any deep (>5 m depth) tidal channel between two bodies of open coastal water.

Species - 1) a group of organisms distinct from any other, or 2) the basic unit of biological classification, and 3) the lowest (or most distinct) category of zoological classification.

Species richness - the number of species in a given sample, assemblage, **community**, **biotope**, or **habitat**.

Spore - the male, female or asexual reproductive cells of algae, mushrooms, lichens, mosses, ferns, lycopods, and horsetails.

Spring tide - the astronomical tide of maximum range, occurring at or just after new moon and full moon. The most marked spring tides (equinoctial springs) occur at the spring and autumn equinoxes.

Strait - Strictly, a strait is the stretch of water between an island and its mainland (or adjacent islands), although the term may be used for any deep (>5 m depth) tidal channel between two bodies of open coastal water.

Strandline - a line on the shore comprising debris deposited by a receding tide; commonly used to denote the line of debris at the level of Extreme High Water.

Sublittoral - see **intertidal** and **subtidal zones**.

Sublittoral fringe - see **intertidal** and **subtidal zones**.

Subspecies - a taxonomic rank that lies below species; usually to describe genetically and / or morphologically distinct **populations** of the species, often caused by geographical isolation.

Substratum (pl. **Substrata**) - material available for **colonisation** by plants and animals; a more correct term in this context than 'substrate'.

Subtidal - a physical term for the sea bed below the lowest astronomical tide (cf. 'sublittoral').

Suspension feeders - filter-feeders, any organisms that feed on particulate organic matter, including **plankton**, suspended in the water column.

Taxon (pl. **Taxa**) - a taxonomic group of any rank, including all its subordinate groups. A taxonomic group may be a single species or a group of related species, e.g. genus, class, order, etc., considered to be sufficiently distinct from other such groups to be treated as a separate unit.

Tellin - the common name for the Family Tellinidae of **bivalve molluscs**. The tellins (Tellinidae) are **bivalves** with thin, flattened, oval to nearly triangular shells. Their shells are often very colourful and they are good burrowers.

Tidal range - generally, the difference in water height between Extreme High Water Springs and Extreme Low Water Springs. Daily tidal range is the difference between high tide and the next low tide.

Tidal stream - the alternating horizontal movement of water associated with the rise and fall of the tide.

Torpor - a state of mental inactivity or physical inactivity (hibernation), where physiological activity is reduced, such as body temperature and metabolism.

Trawl - equipment towed behind a vessel for commercial fishing or scientific collecting. Bottom trawls collect **demersal** species; midwater trawls collect **pelagic** species. See 'dredge', 'netting'.

Tube worm - 1) general term for a worm living in a tube of its own construction (e.g. composed of mucus, cemented **sand** grains or a **calcareous** material) rather than a burrow alone, or 2) common name for members of the Family Serpulidae (Class Polychaeta), which secrete **calcareous** tubes or Family Spirorbidae (Class Polychaeta), which secrete spiral-shaped **calcareous** tubes.

Understorey - organisms occurring under the main canopy of large algae, especially of **kelps**.

Upper shore - an informal term for the area of the shore around the high tide level.

Venerid - the common name for **bivalve molluscs** of the Order Veneroida (Class Bivalvia, Phylum Mollusca). They are characterised by a shell composed of two equal sized valves, with beaks in front of the midline, and a hinge bearing central and lateral teeth.

Very exposed - of **wave exposure** - 1) Open coasts which face into prevailing winds and which receive wind-driven waves and oceanic swell without any offshore obstructions for several hundred kilometres, but where deep water is not close to the shore (50 m depth contour further than about 300 m), and 2) open coasts adjacent to **extremely exposed** sites but which face away from prevailing winds.

Very sheltered - of **wave exposure** - coasts with a fetch less than about 3 km where they face prevailing winds or about 20 km where they face away from prevailing winds, or which have offshore obstructions such as reefs or a narrow (<30 degrees) open water window (based on Hiscock, 1990).

Voe - a ria (in Shetland).

Wave exposed - coasts that face the prevailing wind but which have a degree of shelter because of extensive shallow areas offshore, offshore obstructions, or a restricted window to open water. These sites are not generally exposed to large waves or regular swell.

Wave exposure - the degree of wave action on an open shore, governed by the distance of open sea over which the wind may blow to generate waves (the **fetch**) and the strength and incidence of the winds.

7. SCOTTISH PMF DESCRIPTIONS

Sea bed habitats and their component biotopes and species	Page
Blue mussel beds	22
<i>Mytilus edulis</i> on littoral sediments	23
<i>Mytilus edulis</i> and <i>Fabricia sabella</i> in littoral mixed sediment	24
<i>Mytilus edulis</i> beds on sublittoral sediment	25
<i>Mytilus edulis</i> beds on reduced salinity infralittoral rock	26
Burrowed mud	27
Seapens and burrowing megafauna in circalittoral fine mud	28
Burrowing megafauna and <i>Maxmuelleria lankesteri</i> in circalittoral mud	29
Tall seapen - <i>Funiculina quadrangularis</i>	30
Fireworks anemone - <i>Pachycerianthus multiplicatus</i>	31
Mud burrowing amphipod - <i>Maera loveni</i>	32
Carbonate mound communities	33
Cold-water coral reefs	34
Coral gardens	35
Deep sea sponge aggregations	36
Flame shell beds	37
Horse mussel beds	38
<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata	39
<i>Modiolus modiolus</i> beds on open coast circalittoral mixed sediment	40
<i>Modiolus modiolus</i> beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata	41
<i>Modiolus modiolus</i> beds with <i>Chlamys varia</i> , sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata	42
Inshore deep mud with burrowing heart urchins	43
Intertidal mudflats	44
Kelp and seaweed communities on sublittoral sediment	45
Kelp beds	46
<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed upper infralittoral rock	47
<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock	48
<i>Laminaria hyperborea</i> on tide-swept, infralittoral rock	49
<i>Laminaria hyperborea</i> on tide-swept infralittoral mixed substrata	50
<i>Laminaria hyperborea</i> and foliose red seaweeds on moderately exposed infralittoral rock	51
Low or variable salinity habitats	52
Faunal communities on variable or reduced salinity infralittoral rock	53
Kelp in variable or reduced salinity	54
Submerged fucoids, green or red seaweeds (low salinity infralittoral rock)	55
Sublittoral mud in low or reduced salinity (lagoons)	56
Bird's nest stonewort - <i>Tolypella nidifica</i>	57
Baltic stonewort - <i>Chara baltica</i>	58
Foxtail stonewort - <i>Lamprothamnium papulosum</i>	59
Small brackish water snail - <i>Hydrobia acuta neglecta</i>	60
Maerl beds	61

Maerl or coarse shell gravel with burrowing sea cucumbers	62
Native oysters	63
Native oyster - <i>Ostrea edulis</i>	64
Northern sea fan and sponge communities	65
<i>Caryophyllia smithii</i> and <i>Swiftia pallida</i> on circalittoral rock	66
Mixed turf of hydroids and large ascidians with <i>Swiftia pallida</i> and <i>Caryophyllia smithii</i> on weakly tide-swept circalittoral rock	67
Deep sponge communities (circalittoral)	68
Northern sea fan - <i>Swiftia pallida</i>	69
Offshore deep sea muds	70
Offshore subtidal sands and gravels	71
Seagrass beds	72
<i>Zostera noltii</i> beds in littoral muddy sand	73
<i>Zostera marina/angustifolia</i> beds on lower shore or infralittoral clean or muddy sand	74
<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand	75
Sea loch egg wrack beds	76
Seamount communities	77
Serpulid aggregations	78
Submarine structures made by leaking gases	79
Tide-swept algal communities	80
Fucoids in tide-swept conditions	81
<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment	82
Kelp and seaweed communities in tide-swept sheltered conditions	83
<i>Laminaria hyperborea</i> on tide-swept infralittoral mixed substrata	84
Tide-swept coarse sands with burrowing bivalves	85
Low or limited mobility species	
Burrowing sea anemone - <i>Arachnanthus sarsi</i>	86
Pink sea fingers - <i>Alcyonium hibernicum</i>	87
White cluster anemone - <i>Parazoanthus anguicomus</i>	88
Northern feather star - <i>Leptometra celtica</i>	89
Fan mussel - <i>Atrina fragilis</i>	90
Heart cockle - <i>Glossus humanus</i>	91
Ocean quahog - <i>Arctica islandica</i>	92
Mobile species	
European spiny lobster - <i>Palinurus elephas</i>	93
European eel - <i>Anguilla anguilla</i>	94
Atlantic salmon - <i>Salmo salar</i>	95
European river lamprey - <i>Lampetra fluviatilis</i>	96
Sea lamprey - <i>Petromyzon marinus</i>	97
Sea trout - <i>Salmo trutta</i>	98
Sparling – <i>Osmerus eperlanus</i>	99
Anglerfish - <i>Lophius piscatorius</i>	100
Atlantic halibut - <i>Hippoglossus hippoglossus</i>	101
Atlantic Herring - <i>Clupea harengus</i>	102
Atlantic mackerel - <i>Scomber scombrus</i>	103

Black scabbardfish - <i>Aphanopus carbo</i>	104
Blue Ling - <i>Molva dypterygia</i>	105
Blue whiting - <i>Micromesistius poutassou</i>	106
Cod - <i>Gadus morhua</i>	107
Greenland halibut - <i>Reinhardtius hippoglossoides</i>	108
Horse mackerel - <i>Trachurus trachurus</i>	109
Ling - <i>Molva molva</i>	110
Norway pout - <i>Trisopterus esmarkii</i>	111
Orange roughy - <i>Hoplostethus atlanticus</i>	112
Round-nose grenadier - <i>Coryphaenoides rupestris</i>	113
Saithe - <i>Pollachius virens</i>	114
Sandeels - <i>Ammodytes marinus</i> and <i>Ammodytes tobianus</i>	115
Sand goby - <i>Pomatoschistus minutus</i>	116
Whiting - <i>Merlangius merlangus</i>	117
Basking shark - <i>Cetorhinus maximus</i>	118
Common skate - <i>Dipturus batis</i> complex	119
Leafscale gulper shark - <i>Centrophorus squamosus</i>	120
Porbeagle shark - <i>Lamna nasus</i>	121
Portuguese dogfish - <i>Centroscymnus coelolepis</i>	122
Sandy ray - <i>Leucoraja circularis</i>	123
Spiny dogfish - <i>Squalus acanthias</i>	124
Atlantic white-sided dolphin - <i>Lagenorhynchus acutus</i>	125
Bottlenose dolphin - <i>Tursiops truncatus</i>	126
Fin whale - <i>Balaenoptera physalus</i>	127
Harbour porpoise - <i>Phocoena phocoena</i>	128
Killer Whale - <i>Orcinus orca</i>	129
Long-finned pilot whale - <i>Globicephala melas</i>	130
Minke whale - <i>Balaenoptera acutorostrata</i>	131
Northern bottlenose whale - <i>Hyperoodon ampullatus</i>	132
Risso's dolphin - <i>Grampus griseus</i>	133
Short-beaked common dolphin - <i>Delphinus delphis</i>	134
Sowerby's beaked whale - <i>Mesoplodon bidens</i>	135
Sperm whale - <i>Physeter macrocephalus</i>	136
White-beaked dolphin - <i>Lagenorhynchus albirostris</i>	137
Harbour - <i>Phoca vitulina</i>	138
Grey seal - <i>Halichoerus grypus</i>	139
Otter - <i>Lutra lutra</i>	140

Broad habitat

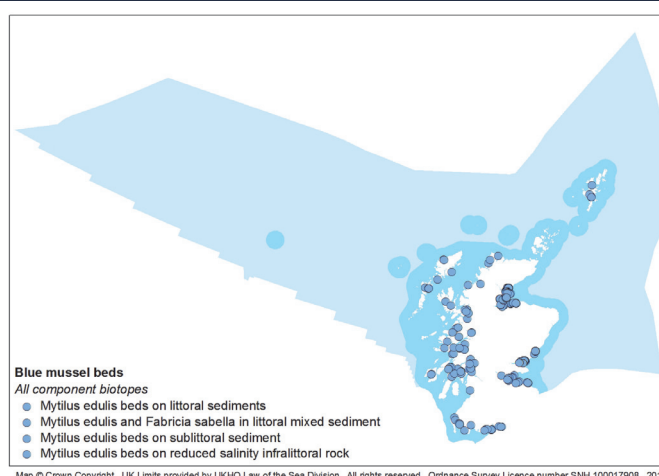
BLUE MUSSEL BEDS

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 and plants, living on, within, or under the bed, and within the underlying sediment. Includes several biotopes depending on the sediment on which it occurs (i.e. **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 rock in reduced salinity (**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 and marine inlets.

Scottish distribution - Found in scattered locations around the Scottish coast, 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, demersal fishing operations (targeted or accidental), pollution and potential development. 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
OSPAR T&D (not all components)
Scottish Biodiversity List
UK BAP (not all components)

Information sources

JNCC Marine Habitat Classification
OSPAR Case Report
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Mytilus edulis beds on littoral sediments - **LS.LBR.LMus.Myt**, including: **LS.LBR.LMus.Myt.Mx**; **LS.LBR.LMus.Myt.Sa**; & **LS.LBR.LMus.Myt.Mu**.

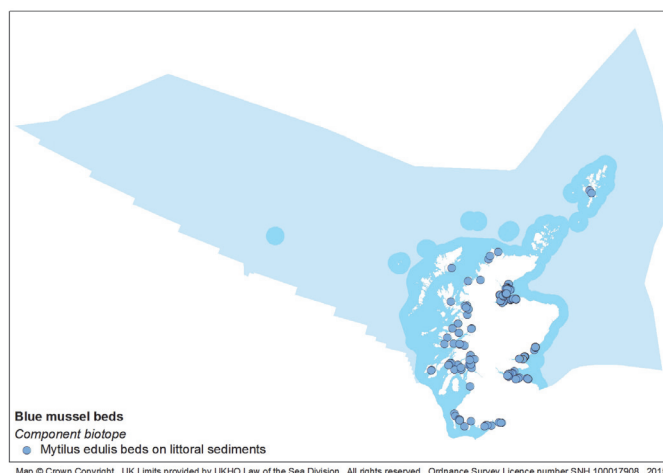
Mytilus edulis and *Fabricia sabella* in littoral mixed sediment - **LS.LSa.St.MytFab**.

Mytilus edulis beds on sublittoral sediment - **SS.SBR.SMus.MytSS**.

Mytilus edulis beds on reduced salinity infralittoral rock - **IR.LIR.IFaVS.MytRS**.

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 on littoral sediments 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, Mudflats and Sandflats)
 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

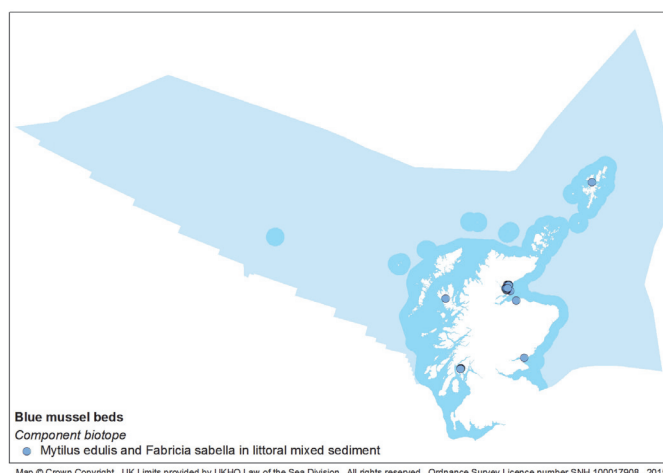
Mytilus edulis beds on mixed littoral sediment - **LS.LBR.LMus.Myt.Mx.**

Mytilus edulis beds on littoral sand - **LS.LBR.LMus.Myt.Sa.**

Mytilus edulis beds on littoral mud - **LS.LBR.LMus.Myt.Mu.**

Component biotope name***MYTILUS EDULIS* AND *FABRICIA SABELLA* IN LITTORAL MIXED SEDIMENT (LS.LSa.St.MytFab)****Image**

Image: SNH

Distribution**Feature description**

Characteristics – Blue mussels (*Mytilus edulis*), typically including high densities of juveniles, 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 sheltered to extremely sheltered, mixed sediment shores in fully marine conditions e.g. sheltered firths and sea lochs.

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

Wider distribution - No records outside of Scotland.

Feature status - An unusual example of a strandline mussel bed, only known from a few locations in Scotland. There are some uncertainties about the biotope, as so little information is available to describe it. 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. They 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

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

Information sources

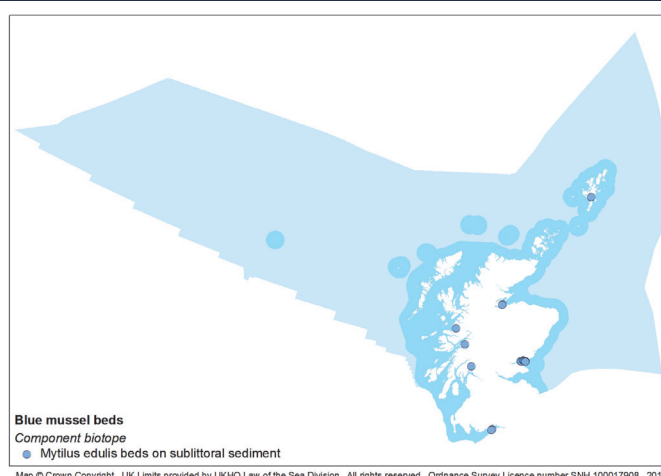
JNCC Marine Habitat Classification
 UK BAP Habitat Definitions

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 and plants, 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 on sublittoral sediment 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)
Scottish Biodiversity List
UK BAP

Information sources

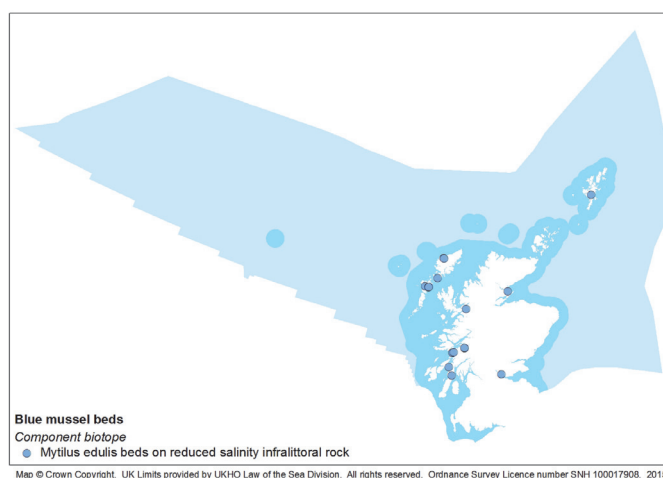
JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

Component biotope name**MYTILUS EDULIS BEDS ON REDUCED SALINITY INFRA-LITTORAL ROCK (IR.LIR.IFaVS.MytRS)****Image**

Image: Paul Kay

Distribution**Feature description**

Characteristics - Dense beds of the blue 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 Ardvay 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, typical of Estuaries)
Scottish Biodiversity List

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

No sub-component biotopes

Broad habitat

BURROWED MUD

Image

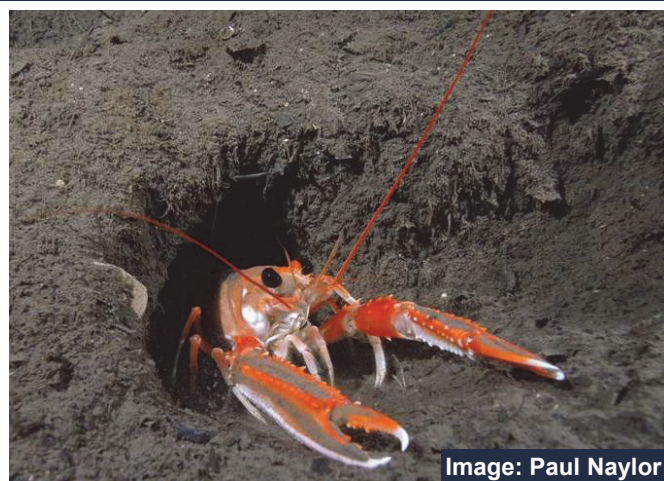
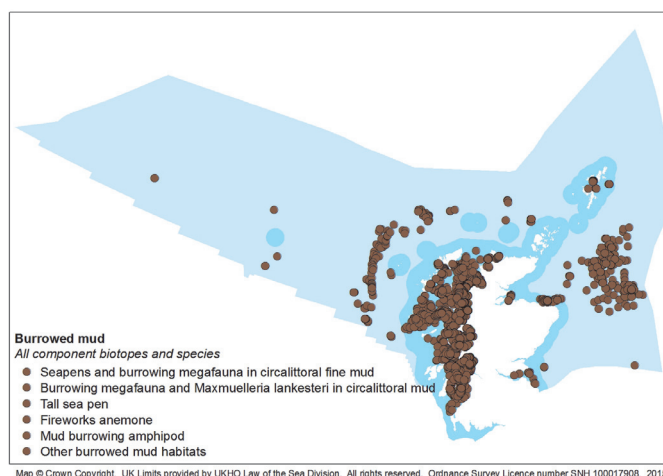


Image: Paul Naylor

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, *Kophobelemnion stelliferum* and *Umbellula encrinus* may be recorded. This habitat can also support populations of the spectacular fireworks anemone (*Pachycerianthus multiplicatus*), and the tall seapen (*Funiculina quadrangularis*) (**SpnMeg.Fun**). Large mounds of mud may also be found where the mud volcano worm (*Maxmuelleria lankesteri*) is present (**MegMax**).

Environmental preferences - 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 the Bay of Biscay.

Feature status - Scottish records of this habitat are of international importance. Marine fish farms within 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 (component biotopes only)
 Scottish Biodiversity List (except *M. loveni*)
 UK BAP (except *M. loveni*)

Information sources

OSPAR Background Document
 UK BAP Habitat Definitions

Component biotopes and species in Scottish waters

Seapens and burrowing megafauna in circalittoral soft mud - **SS.SMu.CFiMu.Spnmeg**, including: **SS.SMu.CFiMu.Spnmeg.Fun**.

Burrowing megafauna and *Maxmuelleria lankesteri* in circalittoral mud - **SS.SMu.CFiMu.MegMax**.

Tall seapen *Funiculina quadrangularis*.

Fireworks anemone *Pachycerianthus multiplicatus*.

Mud burrowing amphipod *Maera loveni*.

Component biotope name

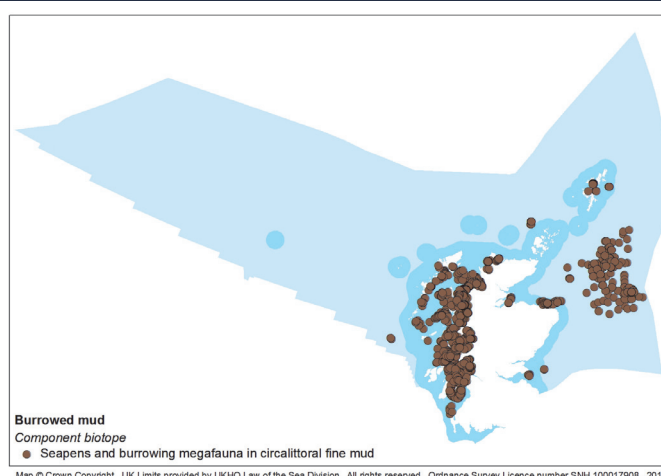
SEAPENS AND BURROWING MEGAFAUNA IN CIRCALITTORAL FINE MUD (SS.SMu.CFiMu.SpnMeg)

Image



Image: Sue Scott

Distribution



Feature description

Characteristics - Stable circalittoral mud with populations of distinctive phosphorescent and slender seapens, *Pennatula phosphorea* and *Virgularia mirabilis*, which protrude from the surface. In deeper waters off the continental shelf, other seapen species such as *Kophobelemnion stelliferum* and *Umbellula encrinus* may be present. 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 deep sheltered areas, this habitat can support populations of the tall seapen *Funiculina quadrangularis*.

Environmental preferences - Occurs in relatively shallow but sheltered muddy basins of sea lochs and voes, at depths of 10-180m in full or variable salinities. Also in deep water on the open coast and further offshore on the continental slope (at 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. Scattered records on the east coast and notable records in offshore waters of the northern North Sea.

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

Feature status - The majority of UK records of this biotope occur in Scotland. Marine fish farms sited within sea lochs may have direct effects on the habitat (smothering, nutrient enrichment and chemical 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
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Background Document

Sub-component biotope in Scottish waters

Seapens, including *Funiculina quadrangularis*, and burrowing megafauna in undisturbed circalittoral fine mud - **SS.SMu.CFiMu.SpnMeg.Fun.**

Component biotope name

**BURROWING MEGAFAUNA AND *MAXMUELLERIA LANKESTERI* IN CIRCALITTORAL MUD
(SS.SMu.CFiMu.MegMax)**

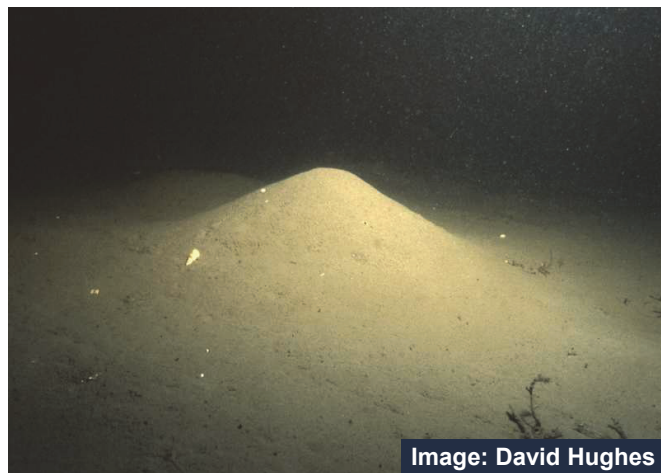
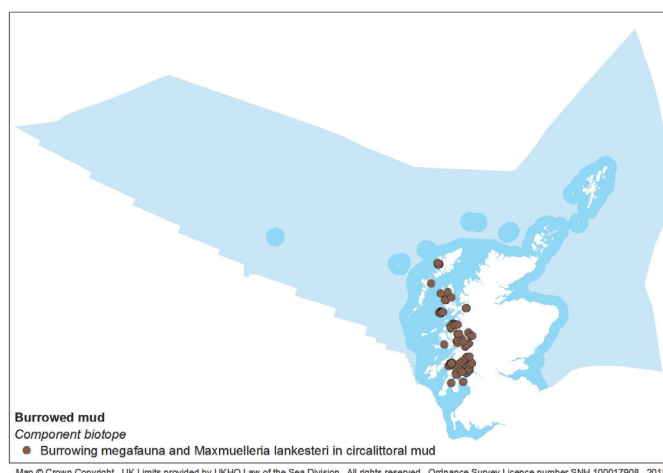
Image

Image: David Hughes

Distribution**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 mud volcano 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

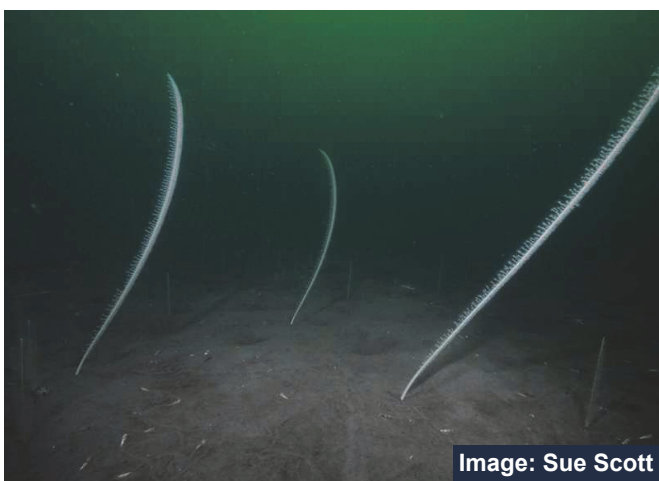
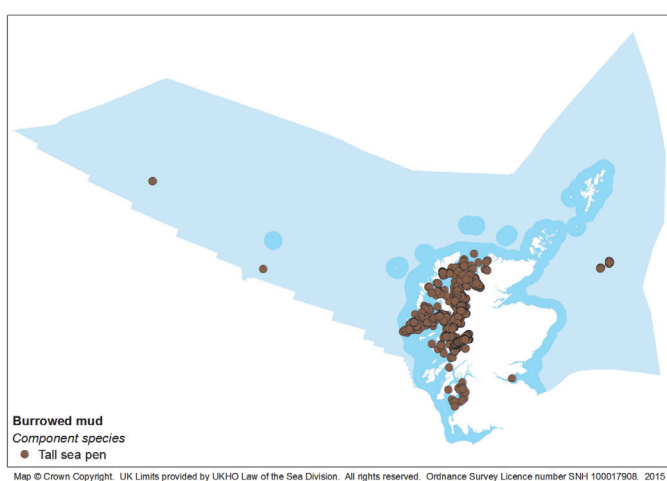
OSPAR T&D
Scottish Biodiversity List
UK BAP


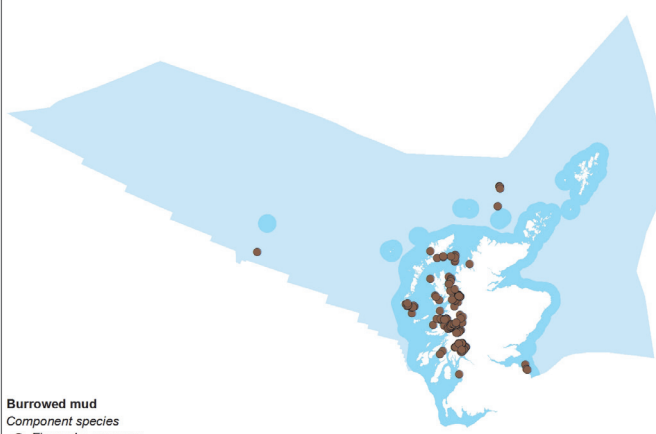
Information sources


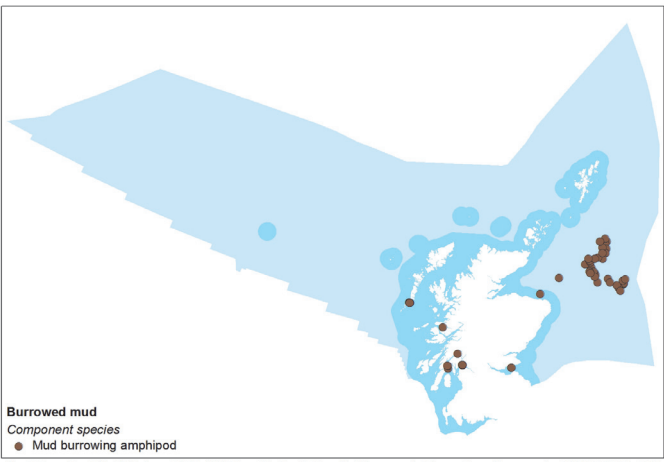
JNCC Marine Habitat Classification
MarLIN
OSPAR Background Document

Sub-component biotopes in Scottish waters

No sub-component biotopes

Common name - <i>Scientific name</i>		Species group
TALL SEAPEN - <i>FUNICULINA QUADRANGULARIS</i>		Sea anemones, sea fans and seapens
<i>Other name(s)</i> - none		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Sue Scott</p>	 <p>Burrowed mud Component species ● Tall sea pen</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>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 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.</p> <p>Habitat - Found in muddy substrata in deep sheltered waters. Within sea lochs they have been recorded as shallow as 20m; however, on the open coast and further offshore, they are found in water deeper than 100m and down to 2000m.</p> <p>Feeding - Feeds on suspended organic particles and plankton.</p> <p>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 Fladen grounds in the northern North Sea, and Hatton Bank in the deep waters to the west of Scotland.</p> <p>Wider distribution - Recorded from the North Atlantic, Mediterranean, New Zealand and Japan.</p> <p>Feature status - In the UK, the tall seapen is almost entirely restricted to western Scotland and to deep, undisturbed muddy sediments. 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.</p>		
Natural heritage importance		Information sources
Scottish Biodiversity List UK BAP		ARKive MarLIN

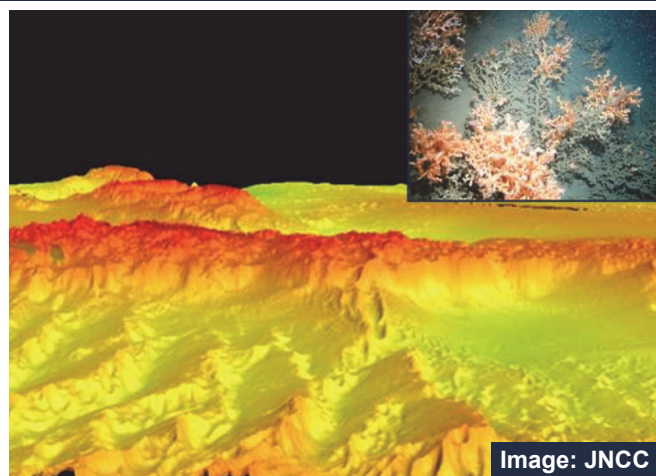
Common name - <i>Scientific name</i>	Species group
FIREWORKS ANEMONE - <i>PACHYCERIANTHUS MULTIPLICATUS</i>	Sea anemones, sea fans and seapens
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none
Image	Distribution
 <p data-bbox="469 808 788 837">Image: Richard Shucksmith</p>	 <p data-bbox="815 779 954 831">Burrowed mud Component species ● Fireworks anemone</p> <p data-bbox="815 835 1469 846">Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>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.</p>	
<p>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.</p>	
<p>Feeding - Feeds on plankton and suspended organic particles drifting in the water column.</p>	
<p>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.</p>	
<p>Wider distribution - Recorded in Kenmare River and Kilkieran Bay (Ireland). Also recorded in Scandinavia.</p>	
<p>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 <i>Nephrops</i>. Static gears (creel fishing) have a lesser impact but can also reduce anemone numbers in fished areas.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	Encyclopedia of Marine Life MarLIN

Common name - <i>Scientific name</i>	Species group
MUD BURROWING AMPHIPOD - <i>MAERA LOVENI</i>	Lobsters and sand hoppers
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none
Image	Distribution
 <p data-bbox="507 772 775 801">Image: Claude Nozères</p>	 <p data-bbox="815 745 986 795">Burrowed mud Component species ● Mud burrowing amphipod</p> <p data-bbox="815 801 1473 808">Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>Characteristics - A relative of sand hoppers, this amphipod has 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 head is 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.</p>	
<p>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 <i>Nephrops norvegicus</i>.</p>	
<p>Feeding - This deposit feeder grazes on algae and detritus in the mud and sand.</p>	
<p>Scottish distribution - A sparsely scattered distribution, primarily offshore, this cold water species reaches the southern limit of its range in Scottish waters.</p>	
<p>Wider distribution - European coasts from Norway to the British Isles. Also recorded from the western North Atlantic, Arctic Ocean, Greenland and Iceland.</p>	
<p>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.</p>	
Natural heritage importance	Information sources
	World Biodiversity Database: Crustacea

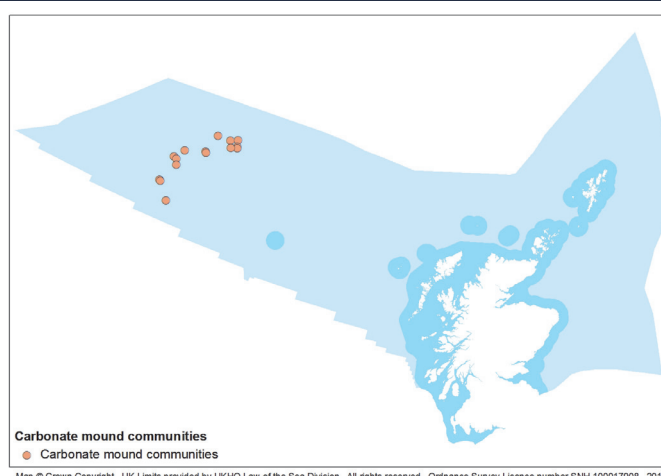
Broad habitat

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 (north-east Atlantic Ocean); Rockall Trough (Irish waters), and the canyons located at the south-west tip of the UK continental shelf.

Feature status - Carbonate mound communities are particularly sensitive to demersal trawling operations.

Natural heritage importance

OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

Component biotopes in Scottish waters

No component biotopes.

Broad habitat

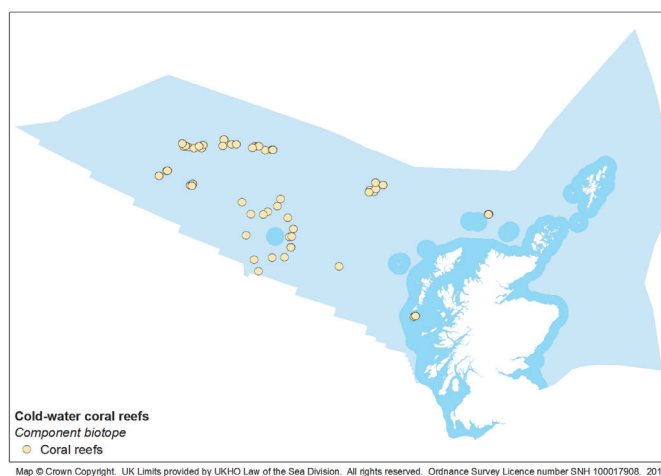
COLD-WATER CORAL REEFS

Image



Image: JNCC

Distribution



Feature description

Characteristics - The cold-water coral *Lophelia pertusa* forms reefs that can be up to several km long and more than 20m high. *Lophelia* reefs often occur in association with other hard corals (e.g. *Madrepora oculata* and *Solenosmilia variabilis*) and the redfish *Sebastes viviparus*. They support extremely rich assemblages of invertebrates - particularly starfish, sea urchins, anemones, squat lobsters (e.g. *Munida sarsi*) and sponges.

Environmental preferences - Typically occur within a depth range of 200-400m on the continental slope although may occur at extremes between 40m and >3000m. Due to the conditions required for *L. pertusa* larvae to settle, reefs typically occur in water temperatures of between 4 and 8°C, in moderate currents of 0.5 knots and on the slopes of seafloor elevations such as seamounts, carbonate mounds and on the edges of steep slopes. *Lophelia* reefs are also associated with iceberg plough-mark areas.

Scottish distribution - Occurs in the Minch off Mingulay below the 110m contour line; on Rockall, Hatton and George Bligh banks; on Anton Dohrn, Rosemary Bank and Hebrides Terrace seamounts, on the Wyville-Thomson Ridge and Darwin Mounds.

Wider distribution - Have a fairly cosmopolitan distribution throughout the world's oceans, with a geographic range from 55°S to 70°N. However, the majority of records occur beyond the shelf break around the NE Atlantic and off Britain, mainly on the continental slopes of west Scotland and Ireland.

Feature status - These reefs are sensitive to demersal trawling operations and localised effects of smothering and marine pollution.

Natural heritage importance

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

Information sources

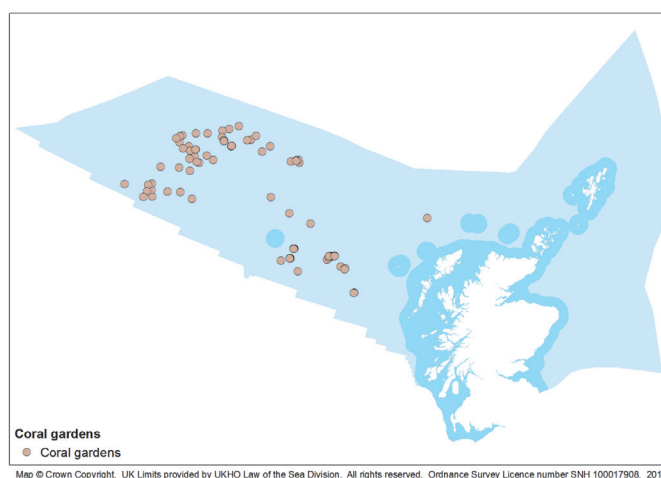
JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
Plymouth University Marine Institute
SAMS
SNH Commissioned Research Report No. 306
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Coral reefs - **SS.SBR.CrI**, including: **SS.SBR.CrI.Lop**

Broad habitat**CORAL GARDENS****Image**

Image: JNCC

Distribution**Feature description**

Characteristics - Coral gardens are highly diverse, 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 100m². Where reef-forming corals occur, they settle in scattered clumps or small colonies. Animals typically associated with coral gardens include basket stars, brittlestars, feather stars, molluscs, crustaceans and deep water fish species.

Environmental preferences - Occur in water temperatures of between 3 - 8°C and at a range of depths; from 30m (in Norwegian fjords) to several thousand metres 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, seapens 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 - There are verified records of coral gardens from within the deep waters of the Rockall Trough to the far west of Scotland. Several different types of coral gardens occur in this region; including: cup coral gardens, lace coral gardens, black coral gardens, bamboo coral gardens and gorgonian coral gardens.

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 sensitive to demersal trawling operations and the effects of smothering.

Natural heritage importance

OSPAR T&D

Information sources

OSPAR Background Document
OSPAR Case Report
Plymouth University Marine Institute

Component biotopes in Scottish waters

No component biotopes, but there are considered to be several different sub-types in the far west of Scotland, as indicated under Scottish distribution above.

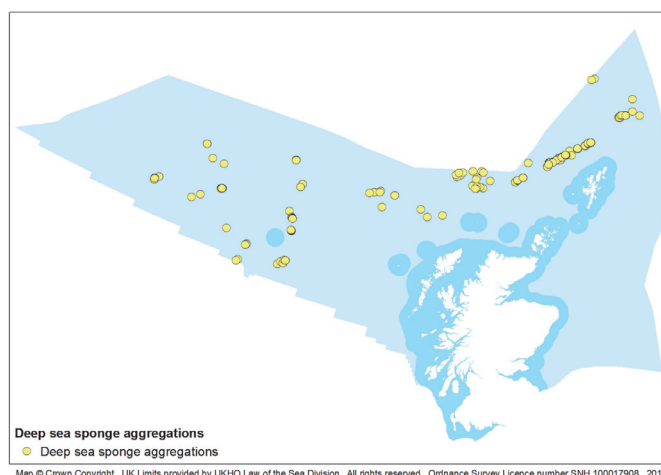
Broad habitat

DEEP SEA SPONGE AGGREGATIONS

Image



Distribution



Feature description

Characteristics - Deep sea sponge aggregations are principally composed of sponges from two classes: the glass sponges (Hexactinellida) and the giant sponges (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 brittlestars. 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 recorded from the Hatton-Rockall Basin. Other records include stalked sponge grounds at the base of the Hebridean continental slope in the Rockall Trough, and records of encrusting sponge dominated aggregations from Rockall Bank.

Wider distribution - Dense aggregations of deep sea sponges are known to occur in various locations across the north-east 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 sea bed 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

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

Information sources

OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

Component biotopes in Scottish waters

No component biotopes, but there are considered to be several different sub-types in Scotland, as indicated under Scottish distribution above.

Broad habitat

FLAME SHELL BEDS

Image

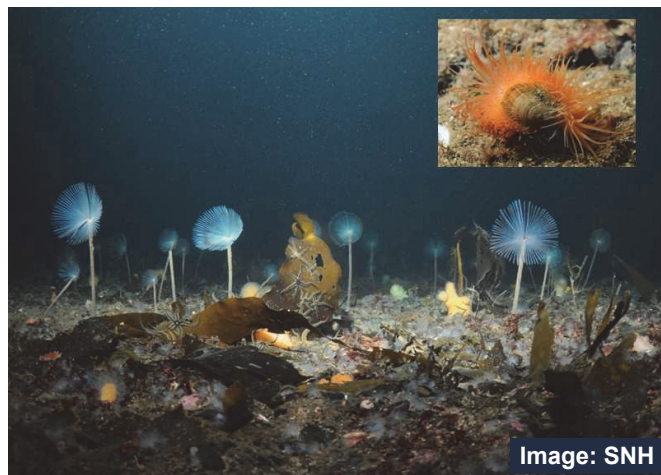


Image: SNH

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 sea bed for several hectares. The carpets create a 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 in various locations, with very extensive beds occurring in Loch Alsh and Loch Sunart. Also found in Scapa Flow, Orkney. 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 sea bed.

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 damage from anthropogenic impacts and are 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

Scottish Biodiversity List
UK BAP

Information sources

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.**

Broad habitat

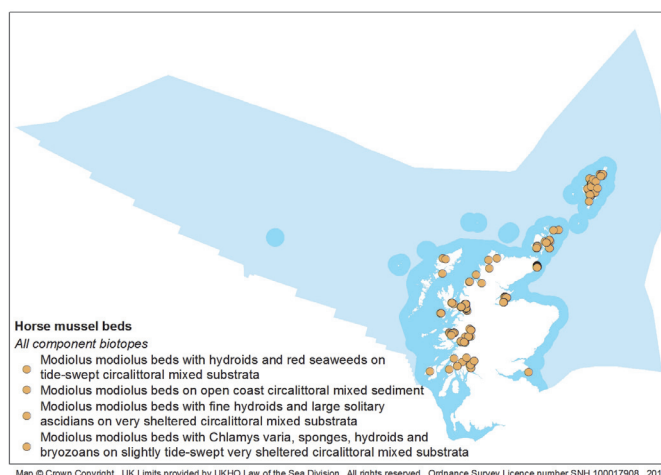
HORSE MUSSEL BEDS

Image



Image: Rob Cook

Distribution



Feature description

Characteristics - The horse mussel *Modiolus modiolus* occurs in scattered clumps, thin layers or dense raised beds, which can extend up to several hectares in size. Raised beds are formed of horse mussels bound together by a matrix of byssus threads. Silt, organically rich faeces and shells accumulate within the structure and further increase the bed height. Horse mussel beds significantly modify sedimentary habitats and provide hard substratum, refuge and ecological niches for a wide variety of organisms. The beds increase local biodiversity and may provide settling grounds for commercially important bivalves, such as queen scallops.

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

Scottish distribution - Recorded from sea lochs, embayments and open coast in Shetland, Orkney, off Caithness and down the west coast with scattered records from the Outer Hebrides and Moray Firth. 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 Llŷn Peninsula, Wales.

Feature status - Scottish waters support 85% of all horse mussel beds in the British Isles which themselves represent most of the habitat within Europe. They are sensitive to physical disturbance and mobile fishing gears may damage and/or remove beds. The extent and quality of 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
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

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

Component biotopes in Scottish waters

Modiolus modiolus beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata - **SS.SBR.SMus.ModT**.

Modiolus modiolus beds on open coast circalittoral mixed sediment - **SS.SBR.SMus.ModMx**.

Modiolus modiolus beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata - **SS.SBR.SMus.ModHAs**.

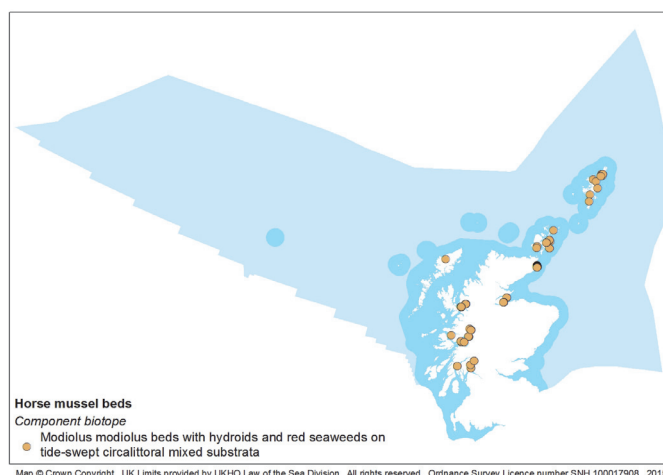
Modiolus modiolus beds with *Chlamys varia*, sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata - **SS.SBR.SMus.ModCvar**.

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 Caithness coast (Noss Head), the Moray Firth, 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 in the Irish Sea off the north-west Llŷn Peninsula (North Wales) and off Co. Down (Northern Ireland).

Feature status - Supporting the majority of horse mussel beds in the British Isles, Scottish waters are nationally important for this habitat which is sensitive to physical disturbance. Mobile fishing gears may damage or completely remove horse mussel beds.

Natural heritage importance

EC Habitats Directive Annex I (Reefs, typical of Large shallow inlets and bays)
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

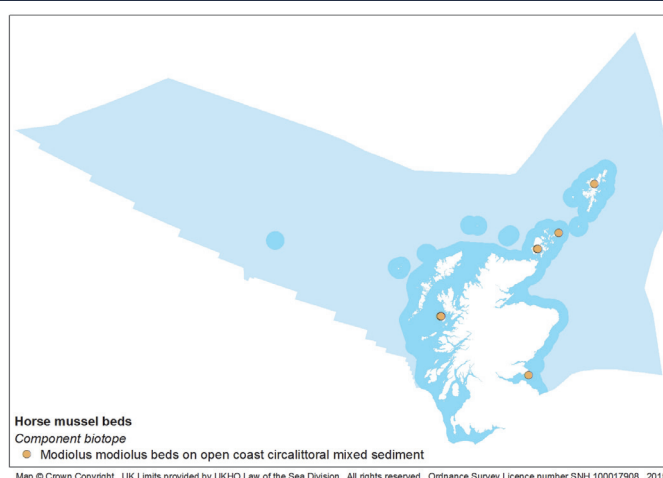
No sub-component biotopes

Component biotope name

**MODIOLUS MODIOLUS BEDS ON OPEN COAST CIRCALITTORAL MIXED SEDIMENT
(SS.SBR.SMus.ModMx)**

Image

Image: Richard Shucksmith

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 byssal threads providing a stabilising effect on the sea bed. 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 present.

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

Scottish distribution - Recorded from the Northern Isles (Sullom Voe, Shetland and Hoy Sound, Orkney) as well as from the Small Isles on the west coast, and Isle of May on the east.

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 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

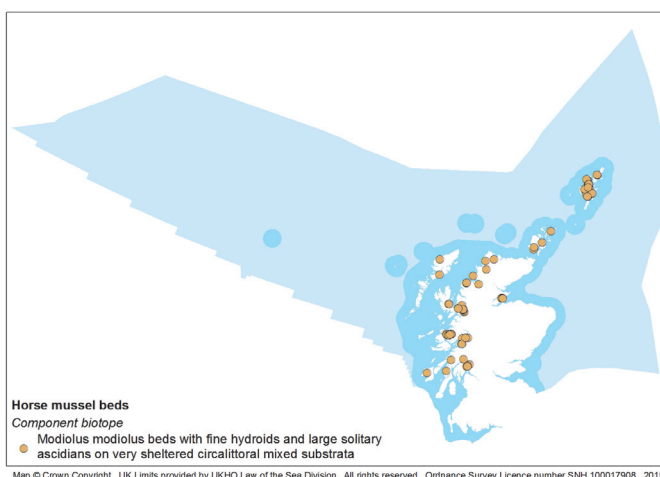
No sub-component biotopes

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**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 fans, 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 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, typical of Large shallow inlets and bays)
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

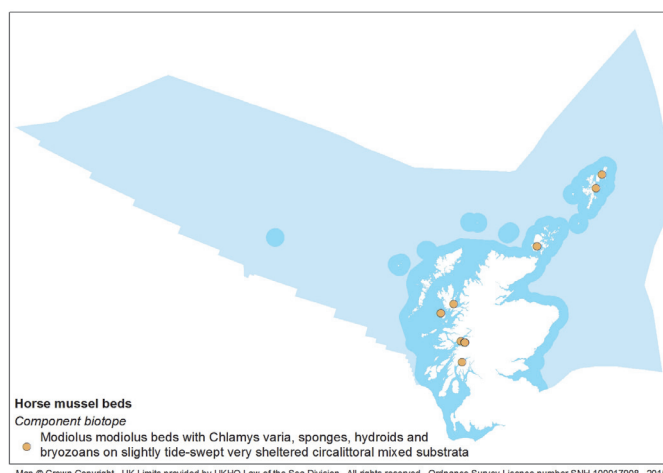
No sub-component biotopes

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: SNH

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 characteristically present 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), as well as from Orkney 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 a rare horse mussel bed biotope and like all biogenic reefs is sensitive to physical disturbance which can adversely affect bed integrity. Mobile fishing gears may damage or completely remove *M. modiolus* beds.

Natural heritage importance

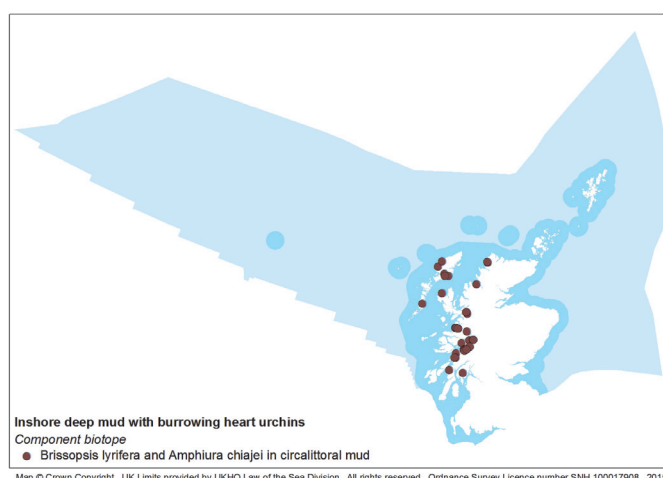
EC Habitats Directive Annex I (Reefs, typical of Large shallow inlets and bays)
OSPAR T&D
Scottish Biodiversity List
UK BAP

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****Image: Bernard Picton****Distribution****Feature description**

Characteristics - The silty muddy basins of sea lochs and other deep, stable waters can provide suitable conditions for this biotope, which is dominated by the heart urchin *Brissopsis lyrifera*, and the brittlestar *Amphiura chiajei*. Several species of burrowing bivalves, polychaete worms and sometimes *Nephrops* and low numbers of sea pens may also occur.

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

Scottish Biodiversity List
UK BAP

Information sources

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**.

Broad habitat

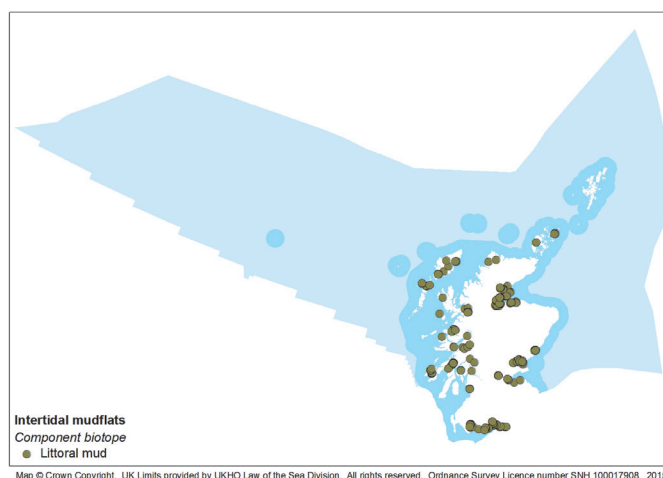
INTERTIDAL MUDFLATS

Image



Image: SNH

Distribution



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Feature description

Characteristics - Compacted silt and clay sediment shores frequented by waders and wildfowl. Intertidal mudflats are an undervalued but vital coastal habitat. Rich in organic material, although generally oxygen limited below the upper few millimetres of sediment, they support a wide diversity of burrowing species including polychaete and oligochaete worms, bivalves and mud shrimp that live within the mud itself, and algae that can thrive on the mud surface. Some species scavenge the surface (e.g. crabs and seabirds) while others feed on the species within the sediment (e.g. fish, waders and some wildfowl).

Environmental preferences - Mudflats form in low energy environments where wave action is minimal, e.g. within estuaries and at the head of marine inlets.

Scottish distribution - Found all around the Scottish coastline in suitable conditions. Notable mudflats are present in Montrose Basin, the Inner Moray Firth, Cromarty Firth, Firth of Tay, Firth of Forth, Solway Firth and in North Uist.

Wider distribution - Present across many areas of the British coastline.

Feature status - Mudflats are sensitive to physical disturbance, changes in wave regime, sea-level rise and pollution. Some are under pressure from coastal development, climate change and commercial shellfish harvesting and bait digging activities.

Natural heritage importance

EC Habitats Directive Annex I (Mudflats and sandflats, typical of Estuaries and Large shallow inlets and bays)
OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

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

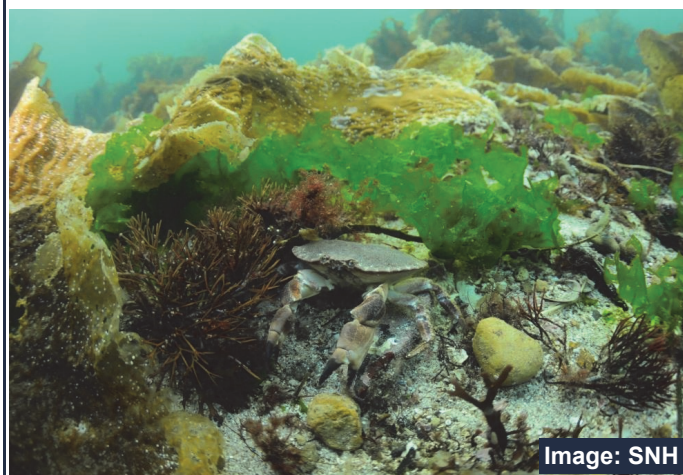
Component biotopes in Scottish waters

Littoral mud - **LS.LMu**, including: **LS.LMu.MEst**; & **LS.LMu.UEst**.

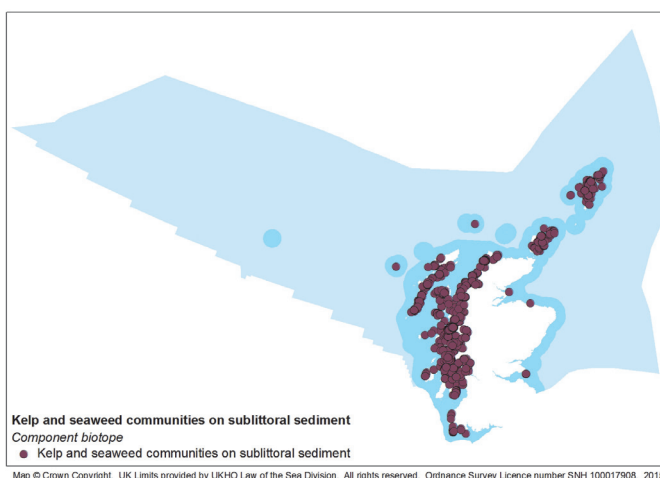
Broad habitat

KELP AND SEAWEED COMMUNITIES ON SUBLITTORAL SEDIMENT

Image



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 algae (e.g. *Phyllophora crispa*) may develop as loose-lying mats on the sediment surface. A diverse array of animals are associated with these kelp and seaweed dominated habitats 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 depth), on a wide variety of substrates (muddy sands and gravels through to cobbles and boulders) and in various 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 (KSwSS.LsacR.CbPb only)
UK BAP (KSwSS.LsacR.CbPb only)

Information sources

JNCC Marine Habitat Classification

Component biotopes in Scottish waters

Kelp and seaweed communities on sublittoral sediment - **SS.SMp.KSwSS**, including:
SS.SMp.KSwSS.LsacR (LsacR.CbPb, LsacR.Gv, LsacR.Sa, LsacR.Mu); **SS.SMp.KSwSS.LsacCho**;
SS.SMp.KSwSS.LsacMxVS; **SS.SMp.KSwSS.LsacGraFS**; **SS.SMp.KSwSS.LsacGraVS** &
SS.SMp.KSwSS.Pcri.

Broad habitat

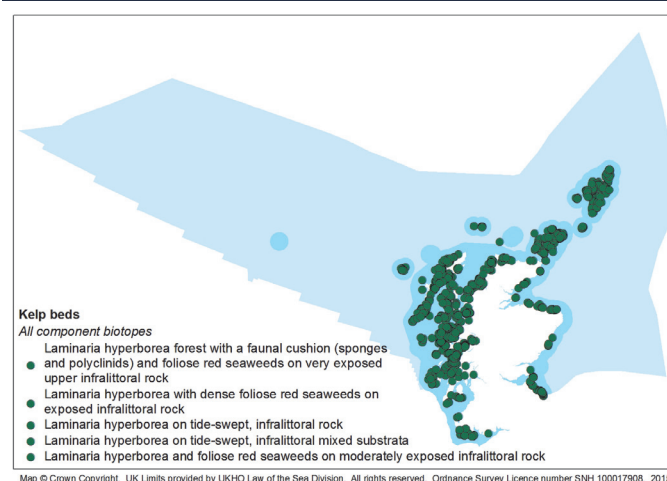
KELP BEDS

Image



Image: Richard Shucksmith

Distribution



Feature description

Characteristics – Beds of the kelp *Laminaria hyperborea* form as forests and parks in rocky coastal areas, under a variety of wave and tidal conditions. The kelp provides a canopy under which a wide range of animals and other seaweeds thrive. A rich diversity of red seaweeds grow among the kelp and on the kelp stipes, while depending on conditions, sea mats and sea fans may colonise the fronds. The rocks below the kelp are often encrusted with coralline algae or support cushion forming fauna, such as sea anemones, sponges and sea squirts. Small crustaceans and worms live among the kelp holdfasts, while sea urchins and sea snails graze on the seaweeds, and fish find shelter from predators among the fronds.

Environmental preferences - Kelp beds occur in shallow waters (to a maximum of 20-30m), on bedrock and boulders in a range of wave exposure regimes and tidal conditions.

Scottish distribution - Widely recorded around all coasts of the Scottish mainland and islands. The more exposed biotopes are particularly recorded from Atlantic coasts in the west and the north.

Wider distribution - Widely recorded around the coasts of the UK and Ireland, although more exposed biotopes are only found on the west coast of Ireland, off Cornwall and south-west Wales.

Feature status - Scotland holds a significant proportion of the UK records of kelp beds and therefore the habitat is considered to be nationally important. The kelp component may be a target for seaweed harvesting, with potential effects on habitat structure and species diversity. Activities which cause changes in wave exposure or tidal flow could also have effects on this habitat.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List (IR.MIR.KR.LhypT & IR.MIR.KR.LhypTX only)
UK BAP (IR.MIR.KR.LhypT & IR.MIR.KR.LhypTX only)

Information sources

JNCC Marine Habitat Classification
MarLIN

Component biotopes in Scottish waters

Laminaria hyperborea forest with a faunal cushion (sponges and polychaetes) and foliose red seaweeds on very exposed upper infralittoral rock - **IR.HIR.KFaR.LhypFa**.

Laminaria hyperborea with dense foliose red seaweeds on exposed infralittoral rock - **IR.HIR.KFaR.LhypR**, including: **IR.HIR.KFaR.LhypR.Ft** & **IR.HIR.KFaR.LhypR.Pk**.

Laminaria hyperborea on tide-swept, infralittoral rock - **IR.MIR.KR.LhypT**, including: **IR.MIR.KR.LhypT.Ft** & **IR.MIR.KR.LhypT.Pk**.

Laminaria hyperborea on tide-swept infralittoral mixed substrata - **IR.MIR.KR.LhypTX**, including: **IR.MIR.KR.LhypTX.Ft** & **IR.MIR.KR.LhypTX.Pk**.

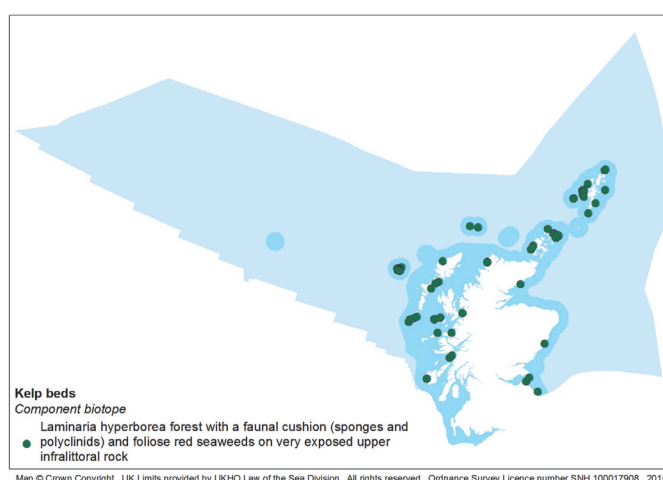
Laminaria hyperborea and foliose red seaweeds on moderately exposed infralittoral rock - **IR.MIR.KR.Lhyp**, including: **IR.MIR.KR.Lhyp.Ft**; **IR.MIR.KR.Lhyp.Pk**; **IR.MIR.KR.Lhyp.GzFt** & **IR.MIR.KR.Lhyp.GzPk**.

Component biotope name

LAMINARIA HYPERBOREA FOREST WITH A FAUNAL CUSHION (SPONGES AND POLYCLINIDS) AND FOLIOSE RED SEAWEEDS ON VERY EXPOSED UPPER INFRALITTORAL ROCK (IR.HIR.KFaR.LhypFa)

Image

Image: SNH

Distribution**Feature description**

Characteristics - The kelp *Laminaria hyperborea* forms a dense forest on bedrock and massive boulders in exposed, wave surged conditions. A diverse range of fauna and flora survive under the kelp canopy. Species vary between locations, but dead man's fingers *Alcyonium digitatum* and sea anemones, such as *Sagartia elegans* and the jewel anemone *Corynactis viridis*, are characteristically present, alongside sponges and sea squirts, while crabs shelter in the kelp holdfasts and urchins graze on the fronds. Foliose and encrusting red algae are also present, both below the canopy and on the stipes of the kelp, competing for space with epiphytic sea fans and sea mats. As the effects of wave surge lessen with increasing depth, the dense cover of sponges, anemones and sea mats may give way to a higher abundance of foliose red seaweeds.

Environmental preferences - Occurs in shallow waters (to 20m depth), on bedrock and large boulders in exposed conditions subject to wave surge.

Scottish distribution - Found in exposed locations on the west coast, including from the Outer Hebrides (e.g. off Barra, outer Loch Roag, and south Harris) and around outlying islands of St Kilda, North Rona and Sula Sgeir, as well as from the Northern Isles (e.g. Papa Stour and Hermaness in Shetland; Sanday, and north-west of Hoy in Orkney). Occasional records from the east coast (e.g. St Abbs Head, Isle of May).

Wider distribution - Recorded off the south and west coasts of Ireland, Wales and Cornwall.

Feature status - Scottish records are of national importance, as most of the UK records of this biotope are within Scotland. The kelp component may be a target for seaweed harvesting, with potential effects on habitat structure and species diversity. Activities which cause changes in wave exposure (e.g. coastal development) could also have effects on this biotope.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)

Information sources

JNCC Marine Habitat Classification
MarLIN

Sub-component biotopes in Scottish waters

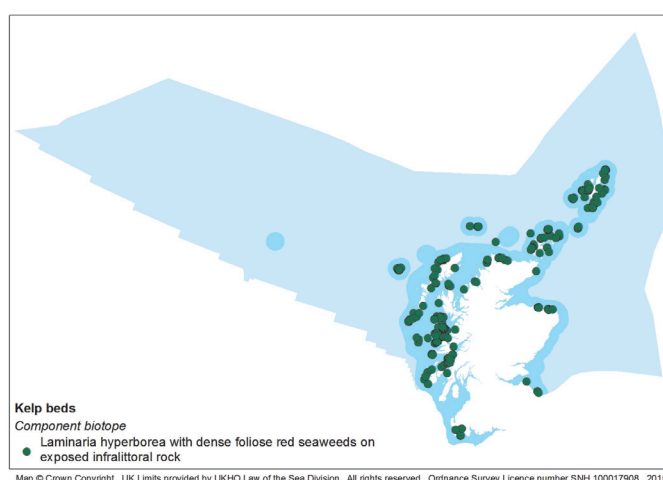
No sub-component biotopes.

Component biotope name

LAMINARIA HYPERBOREA WITH DENSE FOLIOSE RED SEAWEEDS ON EXPOSED INFRALITTORAL ROCK (IR.HIR.KFaR.LhypR)

Image

Image: Richard Shucksmith

Distribution**Feature description**

Characteristics - Stands of the kelp, *Laminaria hyperborea*, with an understory of foliose red seaweeds, occur on exposed bedrock and boulders that are often encrusted with coralline algae. *L. hyperborea* typically forms as kelp forest (LhypR.Ft) in the upper infralittoral zone, and as kelp park (LhypR.Pk) below, in the lower infralittoral. Under the canopy and growing on the kelp stipes, a variety of red seaweeds may be present in abundance, as are some foliose brown seaweeds, such as *Dictyota dichotoma*. Sponges, sea anemones and sea squirts are often present, but at lower densities than in areas where wave surge is higher. Species such as jewel and dahlia anemones, dead man's fingers, the cup coral *Caryophyllia smithii* may be present, particularly at lower depths as part of kelp parks. The kelp also provides shelter for mobile species such as urchins, sea stars and crabs.

Environmental preferences - Occurs in relatively shallow waters (to 30m depth) on bedrock and boulders in exposed and very exposed conditions.

Scottish distribution - Found along the north and west coasts (e.g. Loch Laxford, Loch Eriboll and the Summer Isles), throughout the Inner and Outer Hebrides, as well as from outlying islands of St Kilda, North Rona and Sula Sgeir, and also from the Northern Isles (throughout Orkney, Shetland and Fair Isle). Scattered east coast records (e.g. from the outer Moray Firth and off St Abbs Head).

Wider distribution - Records also occur around the coast of Ireland (except the east coast), Wales and Cornwall.

Feature status - Scottish records are of national importance, as a high proportion of the UK records of this biotope are within Scotland. The kelp component may be a target for seaweed harvesting, with potential effects on habitat structure and species diversity. Activities which cause changes in wave exposure (e.g. coastal development) could also have effects on this biotope.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)

Information sources

JNCC Marine Habitat Classification
MarLIN

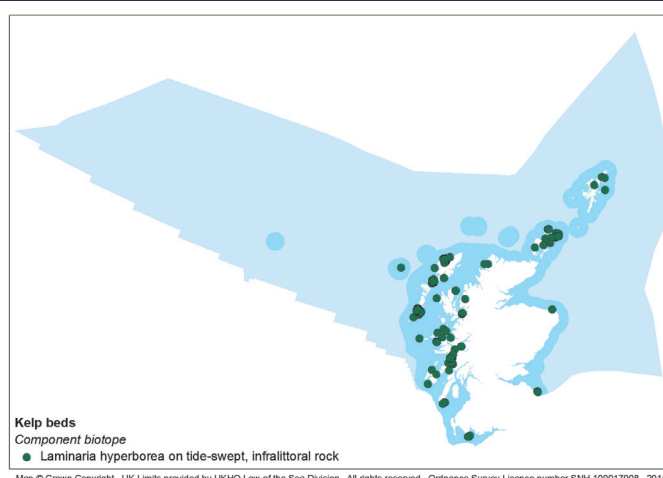
Sub-component biotopes in Scottish waters

Laminaria hyperborea forest with dense foliose red seaweeds on exposed upper infralittoral rock - IR.HIR.KFaR.LhypR.Ft.

Laminaria hyperborea park with dense foliose red seaweeds on exposed lower infralittoral rock - IR.HIR.KFaR.LhypR.Pk.

Component biotope name**LAMINARIA HYPERBOREA ON TIDE-SWEPT, INFRALITTORAL ROCK (IR.MIR.KR.LhypT)****Image**

Image: SNH

Distribution**Feature description**

Characteristics - A wave exposed, tide-swept algal community dominated by forests and parks of the kelp *Laminaria hyperborea* growing on bedrock and boulders. A diverse array of foliose red seaweeds, along with the brown seaweed *Dictyota dichotoma*, is commonly present under the kelp canopy and growing on the kelp stipes. The kelp stipes may also be encrusted with the sea squirt *Botryllus schlosseri*, while sea mats and sea fans often grown on the kelp fronds. Beneath the kelp, sponges, sea mats, sea anemones and colonial sea squirts grow alongside tubeworms and barnacles. The kelp also provides food and shelter for more mobile species, such as crabs, molluscs, sea stars and urchins.

Environmental preferences - Occurs in shallow waters (to 20m depth) on bedrock and boulders on wave exposed coasts that are subject to tidal currents.

Scottish distribution - Found along the west coast of Scotland (e.g. Firth of Lorn, Kyle Rhea), the Outer Hebrides (e.g. the Sound of Barra, Sound of Harris, and outer Loch Roag) and from the Northern Isles (e.g. Papa Westray and Sanday on Orkney; Out Skerries and Bluemull Sound in Shetland), with only limited records from the east coast.

Wider distribution - Recorded off the south and west coasts of Ireland, Wales and Cornwall, with a scattering of records from the north-east of England.

Feature status - The kelp component may be a target for seaweed harvesting, with potential effects on habitat structure and species diversity. Activities which cause changes in wave exposure or tidal regime (e.g. coastal development) could also have effects on this biotope.

Natural heritage importance

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

Information sources

JNCC Marine Habitat Classification
MarLIN
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

Laminaria hyperborea forest, foliose red seaweeds and a diverse fauna on tide-swept upper infralittoral rock - **IR.MIR.KR.LhypT.Ft.**

Laminaria hyperborea park with hydroids, bryozoans and sponges on tide-swept lower infralittoral rock - **IR.MIR.KR.LhypT.Pk.**

Component biotope name

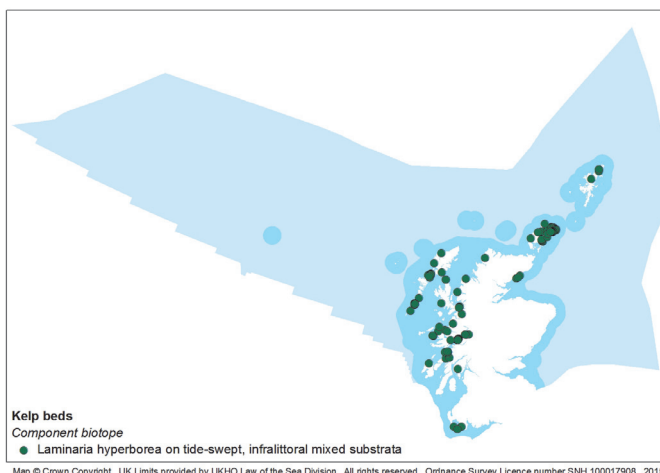
LAMINARIA HYPERBOREA ON TIDE-SWEPT INFRALITTORAL MIXED SUBSTRATA (IR.MIR.KR.LhypTX)

Image



Image: Sue Scott

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 understory 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 biotope 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 loch 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 - Scottish records are of national importance as most of the UK's records of this biotope occur in Scotland. This biotope may be subject to localised harvesting of the kelp with effects on habitat composition and species diversity. Activities that reduce water flow (e.g. coastal development and the introduction of artificial structures) could adversely affect these habitats.

Natural heritage importance

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

Information sources

JNCC Marine Habitat Classification
MarLIN
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.**

Laminaria hyperborea park and foliose red seaweeds on tide-swept lower infralittoral mixed substrata - **IR.MIR.KR.LhypTX.Pk.**

Component biotope name

LAMINARIA HYPERBOREA AND FOLIOSE RED SEAWEEDS ON MODERATELY EXPOSED INFRA-LITTORAL ROCK (IR.MIR.KR.Lhyp)

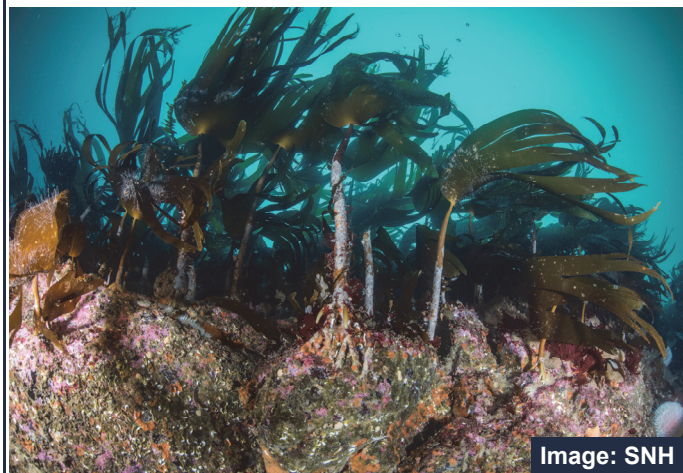
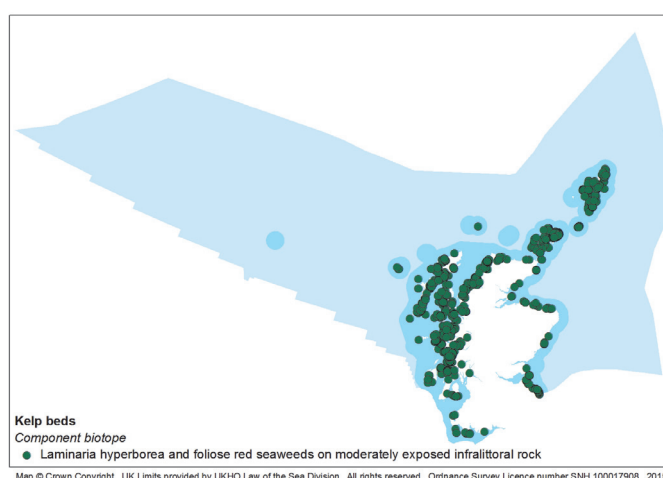
Image

Image: SNH

Distribution**Feature description**

Characteristics - Forests and parks of the kelp *Laminaria hyperborea* on bedrock and boulders in moderately exposed conditions. Foliose red seaweeds form a dense understorey and coralline crusts grow on the rocks below. Some red seaweeds also grow on the kelp stipes, while sea mats and sea firs often colonise the kelp fronds. Although the faunal turf below the kelp canopy is typically less rich than in other kelp dominated communities, the lower wave exposure may enable more delicate red seaweeds to grow. Mobile species such as top shells and sea urchins graze on the seaweed and find shelter among the kelp.

Environmental preferences - Occurs in shallow waters (to 20m depth) on bedrock and boulders on moderately exposed coasts.

Scottish distribution - Widely recorded around all coasts of the Scottish mainland and islands, but particularly off the west coast, around the Hebrides and Northern Isles.

Wider distribution - Recorded off the coasts of Ireland and the UK, with the exception of the south-east of England.

Feature status - Scottish records are of national importance, as a high proportion of the UK records of this biotope are within Scotland. The kelp component may be a target for seaweed harvesting, with potential effects on habitat structure and species diversity.

Natural heritage importance

EC Habitats Directive Annex I (Reefs)

Information sources

JNCC Marine Habitat Classification
MarLIN

Sub-component biotopes in Scottish waters

Laminaria hyperborea forest and foliose red seaweeds on moderately exposed upper infralittoral rock - **IR.MIR.KR.Lhyp.Ft.**

Laminaria hyperborea park and foliose red seaweeds on moderately exposed lower infralittoral rock - **IR.MIR.KR.Lhyp.Pk.**

Grazed *Laminaria hyperborea* forest with coralline crusts on upper infralittoral rock - **IR.MIR.KR.Lhyp.GzFt.**

Grazed *Laminaria hyperborea* park with coralline crusts on lower infralittoral rock - **IR.MIR.KR.Lhyp.GzPk.**

Broad habitat

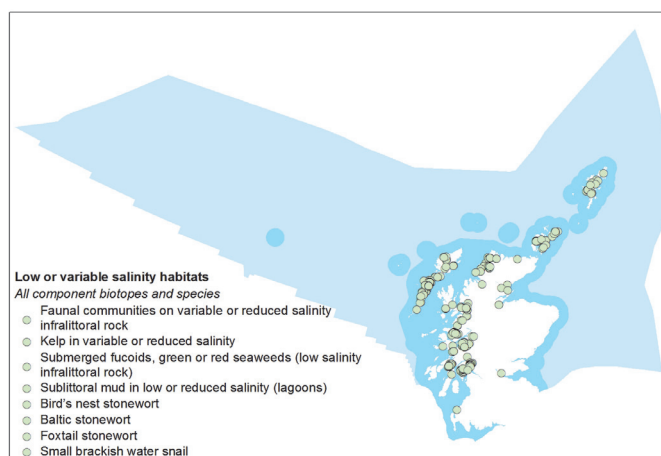
LOW OR VARIABLE SALINITY HABITATS

Image



Image: Stewart Angus

Distribution



Feature description

Characteristics - Low or variable salinity habitats occur where sea water 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, for example, a proportion of the sea water is retained at low tide and the lagoon 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. Specialists include some species of 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 events (storms) which can eradicate small lagoons formed by sediment barriers.

Natural heritage importance

EC Habitats Directive Annex I (component biotopes only)
Wildlife & Countryside Act Schedule 8 (*L. papulosum* only)
Scottish Biodiversity List
UK BAP (not all components)

Information sources

SNH Scottish Lagoons
UK BAP Habitat Definitions

Component biotopes and species in Scottish waters

Faunal communities on variable or reduced salinity infralittoral rock - **IR.LIR.IFaVS**, including:

IR.LIR.IFaVS.MytRS.

Kelp in variable or reduced salinity - **IR.LIR.KVS**, including: **IR.LIR.KVS.Cod**; **IR.LIR.KVS.LsacPsaVS**; & **IR.LIR.KVS.LsacPhyVS**.

Submerged fucoids, green or red seaweeds (low salinity infralittoral rock) - **IR.LIR.Lag**.

Sublittoral mud in low or reduced salinity (lagoons) - **SS.SMu.SMuLS**.

Bird's nest stonewort *Tolypella nidifica*;

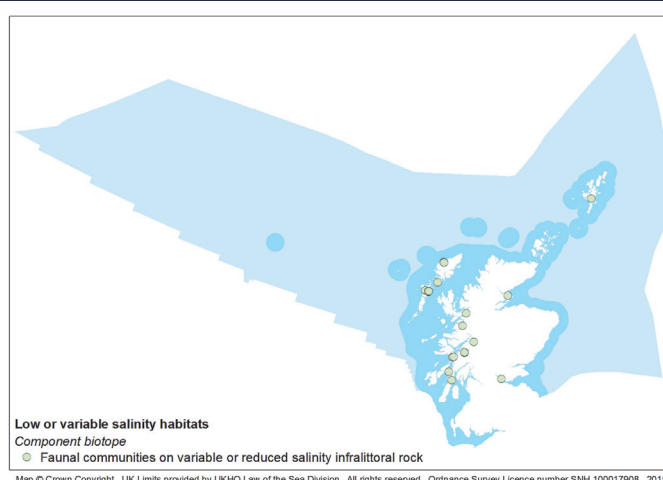
Baltic stonewort *Chara baltica*;

Foxtail stonewort *Lamprothamnium papulosum*; &

Small brackish water snail *Hydrobia acuta neglecta*.

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 occur where salinity is not too low.

Environmental preferences - Occurs in very sheltered sea lochs with variable 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. Ardvay 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 biotope (and two related biotopes) in south-west England.

Feature status - The majority of UK records of this biotope occur in Scotland and are more specifically ascribed to the sub-component biotope **MytRS**. Pressures on this biotope 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, typical of Estuaries and Lagoons)
Scottish Biodiversity List (IFaVS.MytRS only)

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

Mytilus edulis beds on reduced salinity infralittoral rock - **IR.LIR.IFaVS.MytRS**.

Component biotope name

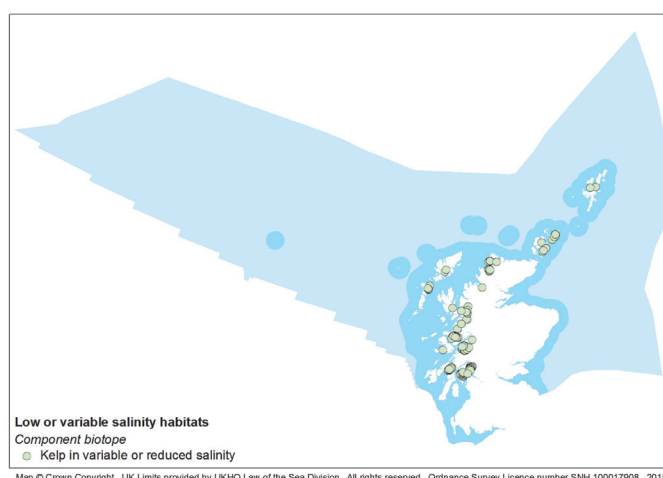
KELP IN VARIABLE OR REDUCED SALINITY (IR.LIR.KVS)

Image



Image: Sue Scott

Distribution



Feature description

Characteristics - This biotope 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 grazing urchins and gastropods, tube-dwelling polychaete worms, sea squirts, barnacles, starfish and brittlestars. Crabs and bivalves may also be present. The sub-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 variable salinity at 0-10m depth; such as sheltered voes in Shetland, in saline lagoons and at the head of fjardic sea lochs.

Scottish distribution - Found in Shetland, Orkney, the Hebrides and the west coast of Scotland. The sub-component biotope **KVS.Cod** is mainly found in Orkney and voes of Shetland and in Loch Sween on the west coast, 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 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, typical of Large shallow inlets and bays; Lagoons)
Scottish Biodiversity List
UK BAP

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**.

Laminaria saccharina and *Psammechinus miliaris* on variable salinity grazed infralittoral rock - **IR.LIR.KVS.LsacPsaVS**.

Laminaria saccharina with *Phyllophora* spp. and filamentous green seaweeds on variable or reduced salinity infralittoral rock - **IR.LIR.KVS.LsacPhyVS**.

Component biotope name

SUBMERGED FUCOIDS, GREEN OR RED SEAWEEDS (LOW SALINITY INFRA-LITTORAL ROCK) (IR.LIR.Lag)

Image

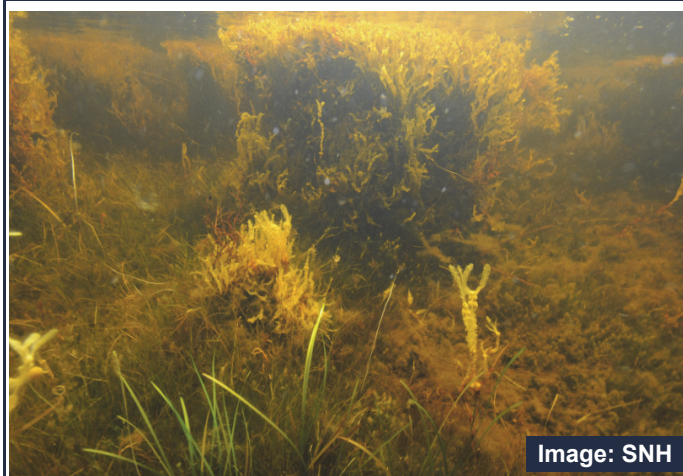
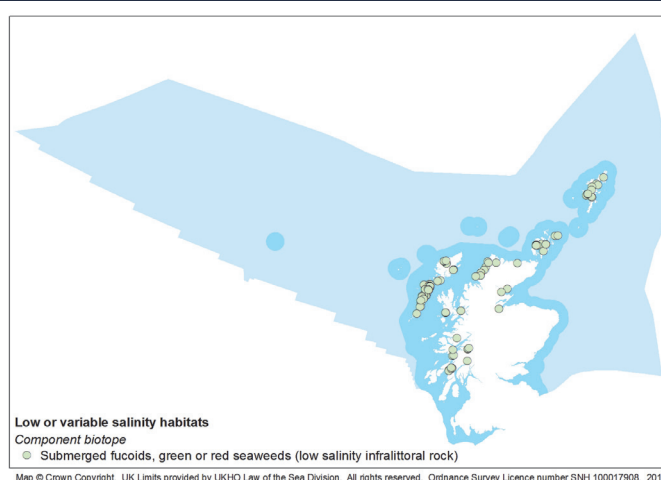


Image: SNH

Distribution



Feature description

Characteristics - A characteristic lagoonal biotope, dominated by dense seaweeds including wracks (fucoids), other brown seaweeds and green filamentous seaweeds on submerged rock. It is unusual because the fucoids can occur subtidally as they are tolerant of the reduced salinity conditions, while their competitors are not. Bladder and toothed wracks dominate **FChoG**, while egg wrack is most abundant in **AscSpAs** with sponges and sea squirts. In **ProtFur**, the wracks are replaced by a dense turf of red seaweeds and filamentous greens. On the fringes of the saline lagoons, horned wrack and gut weeds may become dominant (**FcerEnt**). There are relatively few animal species due to the low salinity levels but grazing snails, shore crabs and mysid shrimp are likely to be present, sometimes in high numbers.

Environmental preferences - Submerged rocky habitats in very shallow lagoons (at 0-5m depth), in reduced or permanently low salinity.

Scottish distribution - Numerous records from the west coast, the Outer Hebrides (e.g. Loch Obisary and Oban nam Fiadh), Orkney (e.g. Loch of Stenness) and Shetland (e.g. the Vadills and Sullom Voe). **AscSpAs** is only recorded from the Outer Hebrides.

Wider distribution - Only recorded in Scotland.

Feature status - This biotope is sensitive to pressures that affect the saline lagoons in which it occurs. Saline lagoons are fragile habitats, susceptible to pollution, changes in water flow, sea-level rise and coastal development (infilling or land claim). Lagoons enclosed by sediment barriers may be lost due to extreme weather events (storms).

Natural heritage importance

EC Habitats Directive Annex I (Reefs, typical of Lagoons)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
SNH Scottish Lagoons
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

Mixed fucoids, *Chorda filum* and green seaweeds on reduced salinity infralittoral rock -

IR.LIR.Lag.FChoG.

Ascophyllum nodosum with epiphytic sponges and ascidians on variable salinity infralittoral rock -

IR.LIR.Lag.AscSpAs.

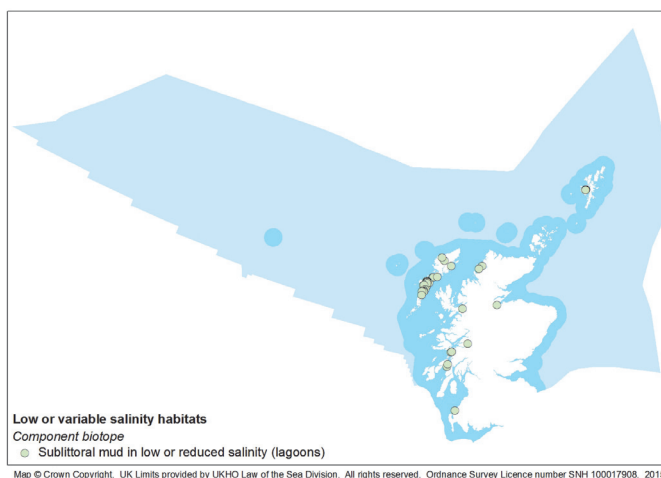
Polyides rotundus and/or *Furcellaria lumbricalis* on reduced salinity infralittoral rock -

IR.LIR.Lag.ProtFur.

Fucus ceranoides and *Enteromorpha* spp. on low salinity infralittoral rock - **IR.LIR.Lag.FcerEnt.**

Component biotope name**SUBLITTORAL MUD IN LOW OR REDUCED SALINITY (LAGOONS) (SS.SMu.SMuLS)****Image**

Image: SNH

Distribution

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Feature description

Characteristics - A characteristic lagoonal biotope. The low salinity muddy sediments support a community of infaunal species. This community can be short-lived and hence variable, including blow lugworms and mud shrimp, which burrow in the muddy sediment. Blue-green algae and crustacean species, including shore crabs, live on the surface and mysid shrimps swim in the water. Ragworms, sludge worms and midge larvae may also live in the sediment. The beaked tasselweed (*Ruppia maritima*) may also occur in some locations.

Environmental preferences - Shallow, muddy and sandy mud sediments in low or reduced salinity in extremely sheltered conditions, with weak tidal streams.

Scottish distribution - Records from the west coast, the Outer Hebrides (e.g. Loch nam Madadh and Loch Roag) and Shetland (the Vadills). This biotope includes *Ruppia* in Craigastrome Pool and Ob Saile, Benbecula and Oban nan Struthan and Oban Trumisgarra, North Uist.

Wider distribution - Only a few records of this biotope exist outside of Scotland, situated around Wales.

Feature status - This biotope is sensitive to pressures that affect the saline lagoons in which it occurs. Saline lagoons are fragile habitats, susceptible to pollution, changes in water flow, sea-level rise and coastal development (infilling or land claim), although a short-lived community like this is likely to recover quickly as long as the mud remains. Lagoons enclosed by sediment barriers may be lost due to extreme weather events (storms).

Natural heritage importance

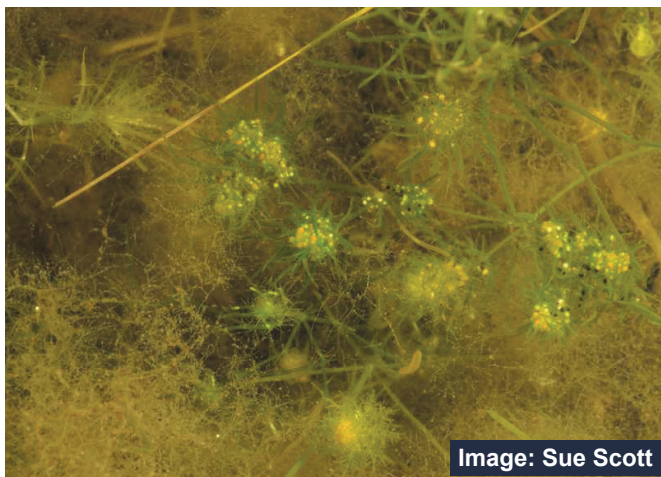
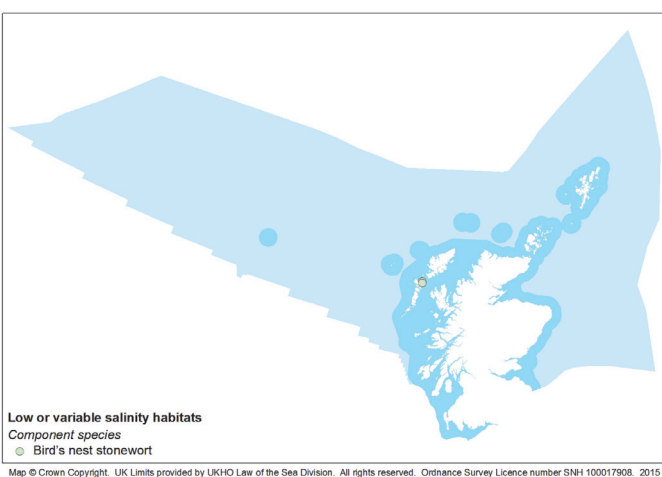
EC Habitats Directive Annex I (typical of Lagoons)
 Scottish Biodiversity List
 UK BAP

Information sources

JNCC Marine Habitat Classification
 SNH Scottish Lagoons
 UK BAP Habitat Definitions


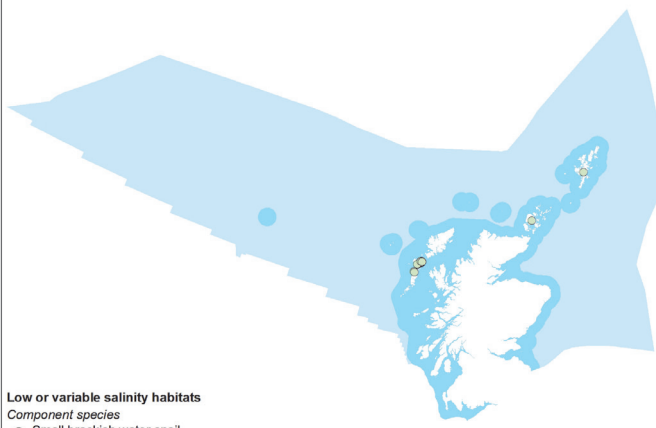
Sub-component biotopes in Scottish waters

No sub-component biotopes

Common name - <i>Scientific name</i>		Species group
BIRD'S NEST STONEWORT - <i>TOLYPELLA NIDIFICA</i>		Stoneworts
<i>Other name(s)</i> - none		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Sue Scott</p>	 <p>Low or variable salinity habitats Component species ● Bird's nest stonewort</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - A rare plant with leaf-like branches arranged in circles around the stem. A mass of fine filaments act as roots. The stems grow to a height of 20-30cm and are dark brownish-green in colour and delicate. The circles of branches on each stem form 3-10 dense heads, each up to 1cm in diameter. The stems also carry tangles of fertile leaf-like structures, which look like miniature bird's nests, with large dark red spores.</p> <p>Habitat - Grows in brackish water that lacks nutrients and in sandy sediments with some silt, usually shallower than 2.5m although sometimes to depths of 10m.</p> <p>Feeding - Stoneworts require light for photosynthesis.</p> <p>Scottish distribution - Recorded in the Loch of Stenness, Orkney (historically) and Loch an Duin and Loch an Strumore in the Outer Hebrides.</p> <p>Wider distribution - Found at a few locations in northern Europe, from around the North Sea, Baltic and northern Norway. It is also found in Australia and New Zealand.</p> <p>Feature status - Scottish populations are the only known records in the British Isles, and are of national and probably international importance. It is in decline throughout Europe, threatened by salinity changes due to sea-level rise and nutrient enrichment leading to smothering by other plants.</p>		
Natural heritage importance		Information sources
GB Red List (Endangered) Scottish Biodiversity List UK BAP		AlgaeBase MarLIN Plantlife Important Stonewort Areas SNH - Stoneworts in Scotland

Common name - <i>Scientific name</i>	Species group
BALTIC STONEWORT - <i>CHARA BALTICA</i>	Stoneworts
<i>Other name(s)</i> - none	<i>Recent synonym</i> - <i>Chara hispida</i> L. var. <i>baltica</i>
Image	Distribution
	
Feature description	
<p>Characteristics - A rare plant with leaf-like branches arranged in circles around the stem. A mass of fine filaments act as roots. It is light bright olive green or dark green in colour, growing to 90cm long, and has small sharp single spines scattered along the stem.</p> <p>Habitat - Grows in variable brackish conditions in sandy and clay sediments at depths of up to 7m, in lagoons, coastal lakes, pools, ditches, streams and sand dune pools. It colonises quickly from bulbils or spores and may benefit from disturbance which reduces competition from vascular plants.</p> <p>Feeding - Stoneworts require light for photosynthesis.</p> <p>Scottish distribution - Found in Loch Bee, Loch an Duin and Loch Strumore in Uist, Outer Hebrides.</p> <p>Wider distribution - A limited number of sites in Britain and Ireland and from coastal sites around Northern Europe, the Baltic, Greenland and Bolivia.</p> <p>Feature status - Scottish populations are likely to be nationally important but threatened by habitat loss, nutrient enrichment, salinity changes and competition from other plants.</p>	
Natural heritage importance	Information sources
GB Red List (Vulnerable) Scottish Biodiversity List UK BAP	AlgaeBase MarLIN Plantlife Important Stonewort Areas SNH - Stoneworts in Scotland

Common name - <i>Scientific name</i>	Species group
FOXTAIL STONEWORT - <i>LAMPROTHAMNIUM PAPULOSUM</i>	Stoneworts
Other name(s) - none	Recent synonym - none
Image	Distribution
 <p data-bbox="576 815 775 842">Image: Sue Scott</p>	 <p data-bbox="815 779 1010 801">Low or variable salinity habitats</p> <p data-bbox="815 804 938 826">Component species</p> <p data-bbox="815 826 938 846">● Foxtail stonewort</p> <p data-bbox="815 837 1468 855">Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>Characteristics - This plant has slender cylindrical stems with leaf-like branches arranged in circles around the stem, and a mass of fine threads acting as roots. The stems grow in clumps or alone, are pale green in colour and reach a height of up to 40cm. Each circle of branches is approximately the same length, but they become shorter and closer together towards the tip of the stem. The result is a dense, sometimes yellow, head with a bushy 'foxtail' appearance. The branches are simple and covered in rings of fine spines.</p>	
<p>Habitat - Grows in brackish, nutrient poor water in sand, gravel, small pebbles or silty substrata in shallow, often transient pools, ponds and lagoons, down to depths of 2m.</p>	
<p>Feeding - Stoneworts require light for photosynthesis.</p>	
<p>Scottish distribution - Recorded from North and South Uist, Outer Hebrides.</p>	
<p>Wider distribution - Found in southern England (the Fleet, Dorset, Hampshire and the Isle of White) in the UK. Sparsely distributed around the coasts of Europe from Norway to the Iberian Peninsula and Mediterranean. Also recorded in Africa and Australia.</p>	
<p>Feature status - Scottish populations are of national importance, and the Hebridean sites are thought to represent the most secure global stronghold for the species. The population is declining throughout the UK and Europe and is threatened by nutrient enrichment, and salinity changes due to sea-level rise.</p>	
Natural heritage importance	Information sources
GB Red List (Near threatened) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule 8	AlgaeBase MarLIN Plantlife Important Stonewort Areas SNH - Stoneworts in Scotland

Common name - <i>Scientific name</i>	Species group
SMALL BRACKISH WATER SNAIL - <i>HYDROBIA ACUTA NEGLECTA</i>	Snails, clams, mussels and oysters
<i>Other name(s)</i> - Lagoonal mud snail	<i>Recent synonym</i> - none
Image	Distribution
 <p data-bbox="486 813 770 840">Image: Dr Roy Anderson</p>	 <p data-bbox="815 779 1010 795">Low or variable salinity habitats</p> <p data-bbox="815 797 930 813">Component species</p> <p data-bbox="815 815 991 831">● Small brackish water snail</p> <p data-bbox="815 835 1469 846"><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics – Mud snails are easily overlooked, and yet important members of muddy shore communities. They are important grazers and a food source for wildfowl and waders. The small brackish water snail is tiny with a shell only 4mm in length and 1.5mm wide. The shell is spiral in shape, tapering from the shell opening to a blunt apex. The shell is brownish or grey but usually looks black. Its head has two tentacles (like land snails), with black patches and a short snout.</p>	
<p>Habitat - Found almost exclusively on mud around the shores of lagoons and brackish water, and prefers areas of seagrass and <i>Potamogeton</i> pondweeds. Also found in brackish water lochs, creeks and in some ditches to open coasts.</p>	
<p>Feeding - Feeds on diatoms which it licks off the surface of sand or mud grains or plant leaves.</p>	
<p>Scottish distribution - Scattered records from the Outer Hebrides (e.g. Loch Bee, Loch nam Madadh), Orkney (Ouse of Finstown) and Shetland (Loch of Hellister).</p>	
<p>Wider distribution - Found on North Sea coasts, the west coast of Ireland and Guernsey. It has also been recorded in Denmark.</p>	
<p>Feature status - The majority of British records of this species are from Scotland. Small brackish water snails are restricted to lagoons and similar brackish habitats that are sensitive to coastal development and pollution, as well as changes in the local water flow and sea-level rise.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List	Marine Species Information Portal

Broad habitat

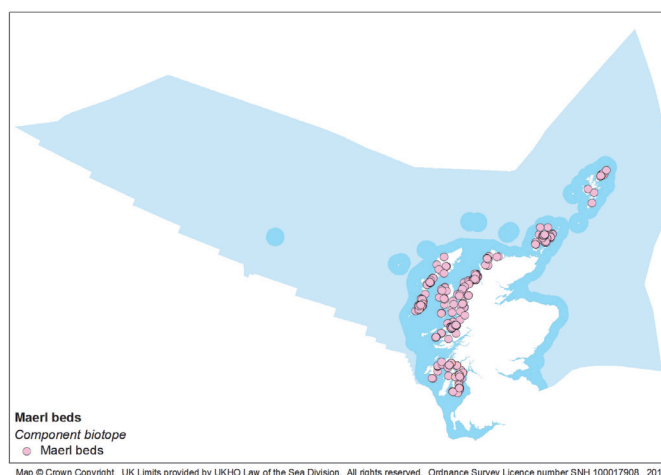
MAERL BEDS

Image



Image: Marine Scotland

Distribution



Feature description

Characteristics - Maerl beds are formed by 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 1000s of 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 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

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

Information sources

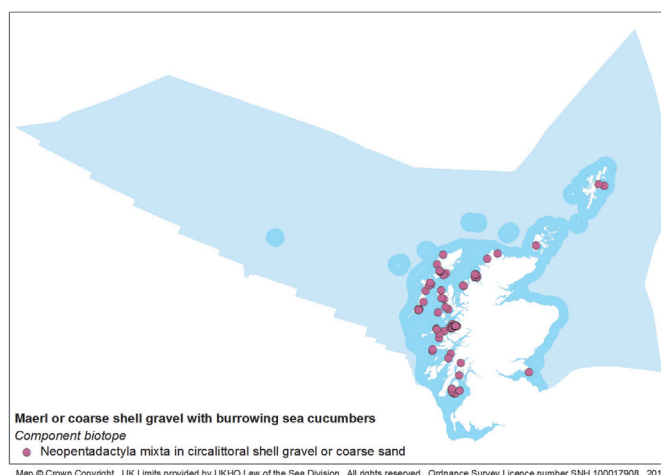
JNCC Marine Habitat Classification
OSPAR Case Report
UK BAP Habitat Definitions
UK MarineSACs Overview

Component biotopes in Scottish waters

Maerl beds - **SS.SMp.Mrl**, including: **SS.SMp.Mrl.Pcal** (inc. **Pcal.R** & **Pcal.Nmix**); **SS.SMp.Mrl.Lgla**; & **SS.SMp.Mrl.Lcor**.

Broad habitat**MAERL OR COARSE SHELL GRAVEL WITH BURROWING SEA CUCUMBERS****Image**

Image: SNH

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, the 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 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 (Subtidal sandbanks)
Scottish Biodiversity List
UK BAP

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**.

Broad habitat

NATIVE OYSTERS

Component biotope name

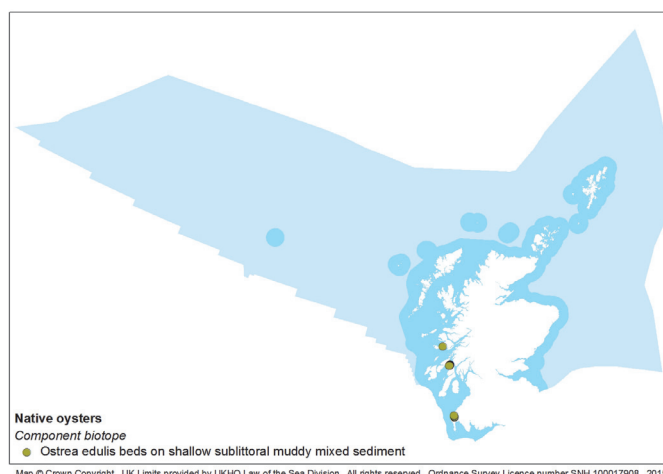
SUBLITTORAL MUD IN LOW OR REDUCED SALINITY (LAGOONS) (SS.SMu.SMuLS)

Image



Image: SNH

Distribution



Feature description

Characteristics - This once widespread habitat comprises dense beds of the native oyster *Ostrea edulis* (at densities of 5 or more per m²). A diverse community lives 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 known 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 have also been recorded 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, Shetland and the Firth of Forth. 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 129km² 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


OSPAR T&D
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
OSPAR Case Report
SNH - native oyster leaflet
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

Common name - <i>Scientific name</i>	Species group
NATIVE OYSTER - <i>OSTREA EDULIS</i>	Snails, clams, mussels and oysters
<i>Other name(s)</i> - flat oyster, European oyster	<i>Recent synonym</i> - none
Image	Distribution
 <p data-bbox="635 779 774 808">Image: SNH</p>	 <p data-bbox="815 741 930 790">Native oysters Component species ● Native oyster</p> <p data-bbox="815 797 1469 808"><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - The native oyster <i>Ostrea edulis</i> 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. <i>O. edulis</i> typically lives for 6-10 years, although it can exceed 15 years.</p>	
<p>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.</p>	
<p>Feeding - Oysters filter feed on suspended organic particles and plankton.</p>	
<p>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).</p>	
<p>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.</p>	
<p>Feature status - The majority of current records in the UK are from the west coast of Scotland although populations are significantly depleted 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 illegal harvesting from sea lochs. Native oysters are the property of The Crown and their collection from the wild is unlawful without a licence from The Crown Estate.</p>	
Natural heritage importance	Information sources
OSPAR T&D Scottish Biodiversity List UK BAP	ARKive MarLIN OSPAR Case Report SNH - native oyster leaflet

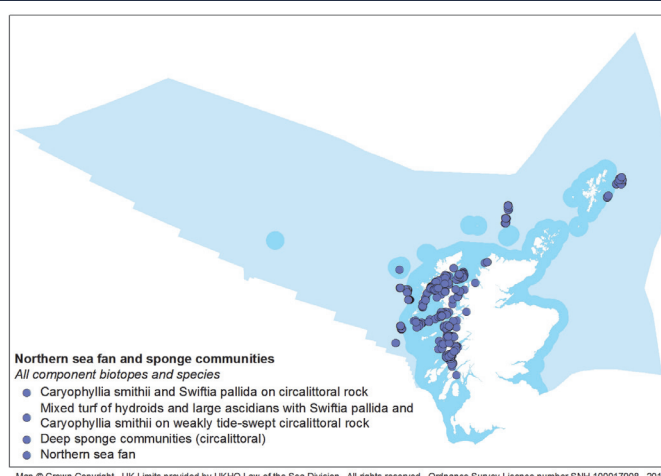
Broad habitat

NORTHERN SEA FAN AND SPONGE COMMUNITIES

Image



Distribution



Feature description

Characteristics - A diverse habitat characterised by aggregations of the northern 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 fans, 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 fans are present but sea fans are still frequent. In slightly more tide-swept areas (**XFa.SwiLgAs**) biological diversity appears to increase. *S. pallida* can host the nationally rare sea fan anemone (*Amphianthus dohrnii*).

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 depths of 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. 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 the northern 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 (component biotopes only)
JNCC Marine Habitat Classification
Scottish Biodiversity List
UK BAP

Information sources

Component biotopes and species in Scottish waters

Caryophyllia smithii and *Swiftia pallida* on circalittoral rock - **CR.MCR.EcCr.CarSwi**, including:

CR.MCR.EcCr.CarSwi.Aglo & **CR.MCR.EcCr.CarSwi.LgAs**.

Mixed turf of hydroids and large ascidians with *Swiftia pallida* and *Caryophyllia smithii* on weakly tide-swept circalittoral rock - **CR.HCR.XFa.SwiLgAs**.

Deep sponge communities (circalittoral) - **CR.HCR.DpSp**, including: **DpSp.PhaAxi**.

Northern sea fan *Swiftia pallida*.

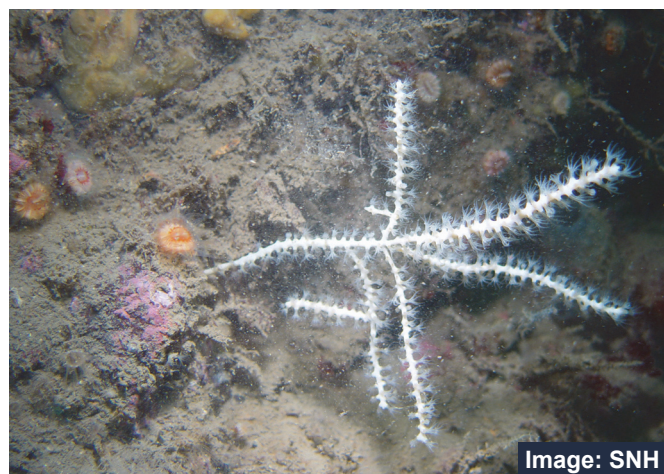
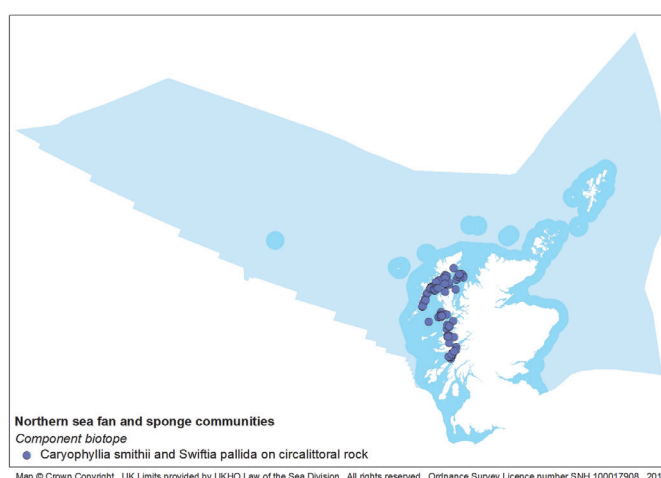
Component biotope name**CARYOPHYLLIA SMITHII AND SWIFTIA PALLIDA ON CIRCALITTORAL ROCK (CR.MCR.EcCr.CarSwi)****Image**

Image: SNH

Distribution**Feature description**

Characteristics - Dense aggregations of the cup coral *Caryophyllia smithii* with 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 fans, soft corals, large sea squirts and feather stars, although this biotope is typically less diverse than **CR.HCR.XFa.SwiLgAs**. Foliose red and brown algae may also occur in shallower locations. Crevices and overhangs shelter sea cucumbers, squat lobsters and wrasse. Large sea squirts are characteristically present in **CarSwi.LgAs** and the white cluster anemone *Parazoanthus anguicomus* may be recorded, while in the siltier **CarSwi.Aglo**, red sea fingers 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 depth.

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 the northern 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
 UK BAP

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**.

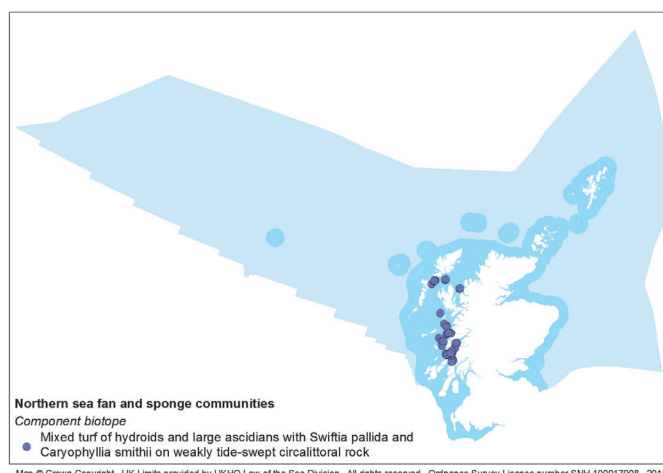
Caryophyllia smithii, *Swiftia pallida* and large solitary ascidians on exposed or moderately exposed circalittoral rock - **CR.MCR.EcCr.CarSwi.LgAs**.

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 biotope 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 fans 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 10 - 40m.

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 biotope. This biotope occurs at the southern limits of the northern 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
UK BAP

Information sources

JNCC Marine Habitat Classification

Sub-component biotopes in Scottish waters

No sub-component biotopes

Component biotope name

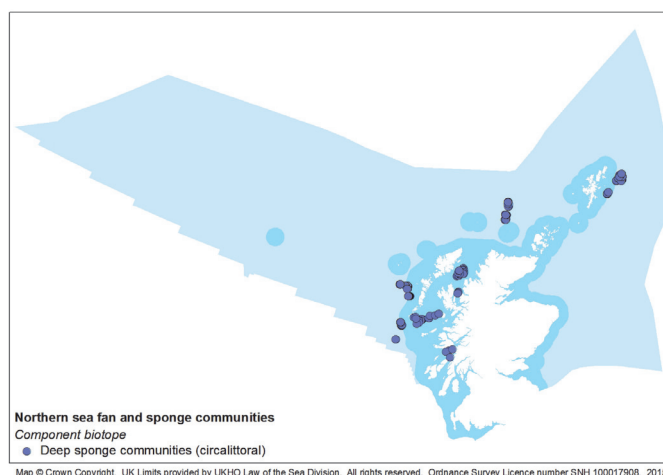
DEEP SPONGE COMMUNITIES (CIRCALITTORAL) (CR.HCR.DpSp)

Image



Image: Marine Scotland Science

Distribution



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 locally numerous.

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 Solan Bank in offshore waters to the north of Scotland. Closer inshore, the habitat is located off the coast of Mingulay, in The Minch 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 recorded. Sensitive to physical abrasion, smothering and pollution.

Natural heritage importance


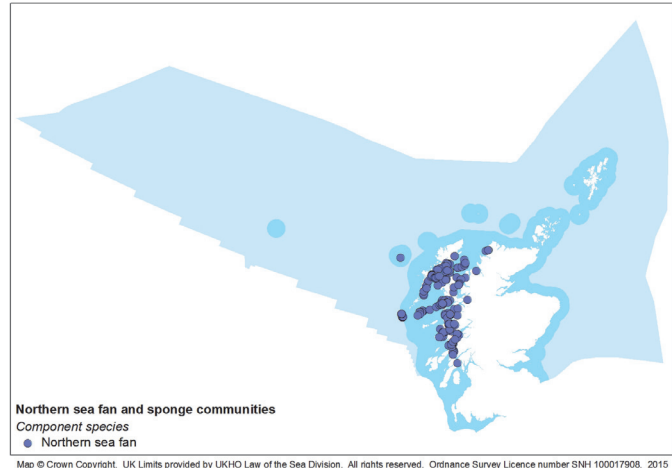
EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP (DpSp.PhaAxi only)

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.

Common name - <i>Scientific name</i>	Species group
NORTHERN SEA FAN - <i>SWIFTIA PALLIDA</i> <i>Other name(s)</i> - none	Sea anemones, sea fans and seapens <i>Recent synonym</i> - none
Image	Distribution
	
Feature description	
<p>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. This species is a host for the nationally rare sea fan anemone <i>Amphianthus dohrnii</i>.</p>	
<p>Habitat - Generally found in areas of good water movement, attached to rocks and boulders, and at depths of 20-60m (although it has been recorded at over 2000m). Also found on pebbles and cobbles lying in coarse shell, sand and silt.</p>	
<p>Feeding - Feeds on plankton and suspended organic particles.</p>	
<p>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.</p>	
<p>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.</p>	
<p>Feature status – Almost all of the current UK records are from the west coast of Scotland. The northern sea fan is sensitive to physical abrasion, siltation, pollution and climate change. Pressures may include mobile demersal fishing activities and aquaculture. The species is adapted to a temperature range of 4-13°C; therefore a climate change induced increase in temperature may lead to the reduction or loss of <i>S. pallida</i> in Scottish waters.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	Encyclopedia of Marine Life MarLIN

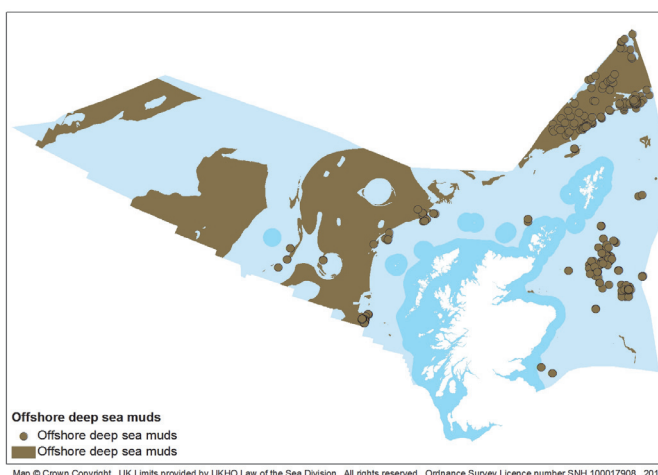
Broad habitat

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 sea bed include various types of 'worms', sea spiders, 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.

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

Offshore circalittoral mud - **SS.SMu.OMu**, including: **SS.SMu.OMu.AfalPova**; **SS.SMu.OMu.ForThy**; **SS.SMu.OMu.LevHet**; **SS.SMu.OMu.PjefThyAfil** & **SS.SMu.OMu.MyrPo**.

Atlantic and Arctic bathyal and abyssal sediments - no code.

Broad habitat

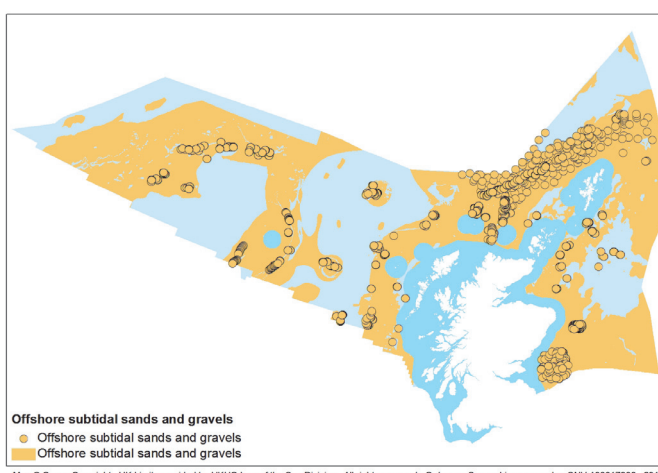
OFFSHORE SUBTIDAL SANDS AND GRAVELS

Image



Image: JNCC

Distribution



Offshore subtidal sands and gravels
 ● Offshore subtidal sands and gravels
 ● Offshore subtidal sands and gravels

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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 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.

Environmental preferences - 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 down to 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 sea bed.

Natural heritage importance

EC Habitats Directive Annex I (Subtidal sandbanks)
 – SS.SSa.CFiSa only
 UK BAP

Information sources

JNCC Marine Habitat Classification
 UK BAP Habitat Definitions

Component biotopes in Scottish waters

Offshore coarse sand - **SS.SCS.OCS**, including: **SS.SCS.OCS.GlapThyAmy** & **SS.SCS.OCS.HeloPkef**.
 Circalittoral fine sand - **SS.SSa.CFiSa**, including: **SS.SSa.CFiSa.EpusOborApri** & **SS.SSa.CFiSa.ApriBatPo**.
 Offshore circalittoral sand or muddy sand - **SS.SSa.OSa**, including: **SS.SSa.OSa.MalEdef** & **SS.SSa.OSa.OfusAfil**.
 Atlantic and Arctic bathyal and abyssal sediments - no code.

Broad habitat

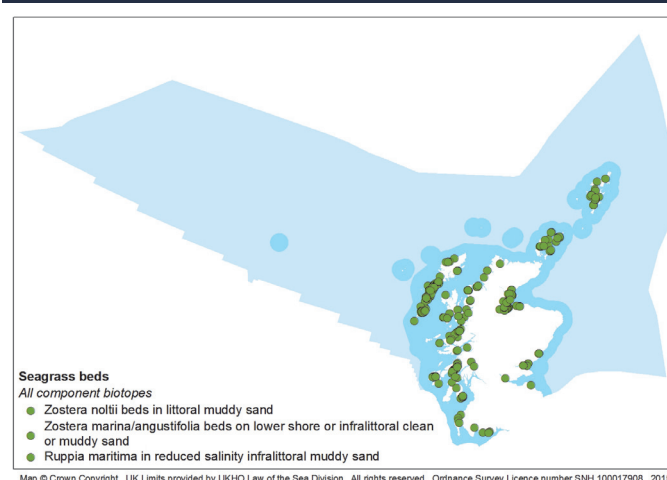
SEAGRASS BEDS

Image



Image: SNH

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 biotopes 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 upper 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 Beaully Firths; the Sounds of Barra and Harris; and in Orkney and Shetland.

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 Dorset.

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. Most of the UK *Ruppia* bed records are from Scotland. Seagrass beds are sensitive to physical damage (e.g. trampling in the intertidal or anchoring in the subtidal), nutrient enrichment, 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 1920s and '30s).

Natural heritage importance

EC Habitats Directive Annex I
 OSPAR T&D (*Zostera* component biotopes only)
 Scottish Biodiversity List
 UK BAP

Information sources

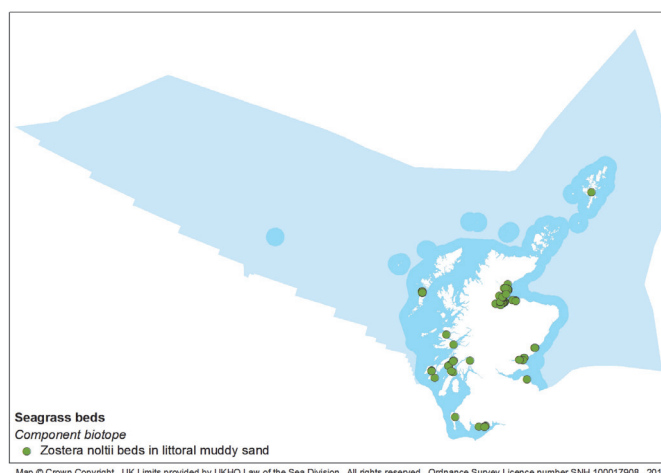
OSPAR Case Report (*Zostera* spp.)
 UK BAP Habitat Definitions
 UK Marine SACs Overview (*Zostera* spp.)
 WWF Marine Health Check (*Zostera* spp.)

Component biotopes in Scottish waters

Zostera noltii beds in littoral muddy sand - **LS.LMp.LSgr.Znol.**

Zostera marina/angustifolia beds on lower shore or infralittoral clean or muddy sand - **SS.SMp.SSgr.Zmar.**

Ruppia maritima in reduced salinity infralittoral muddy sand - **SS.SMp.SSgr.Rup.**

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 in intertidal areas, sometimes permanently submerged in small pools, or in muddy substrates where water is retained, preventing the roots from drying out. Although typically associated with the mid to upper shore, *Z. noltii* may overlap with narrow-leaved eelgrass *Z. marina* var. *angustifolia* where it occurs 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 and are potentially an important carbon store.

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 community) in Britain, possibly in Europe, covering an area of approximately 12km². Dwarf eelgrass beds are 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, such as the common cord grass.

Natural heritage importance

EC Habitats Directive Annex I (Mudflats & Sandflats, typical of Lagoons, Estuaries)
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

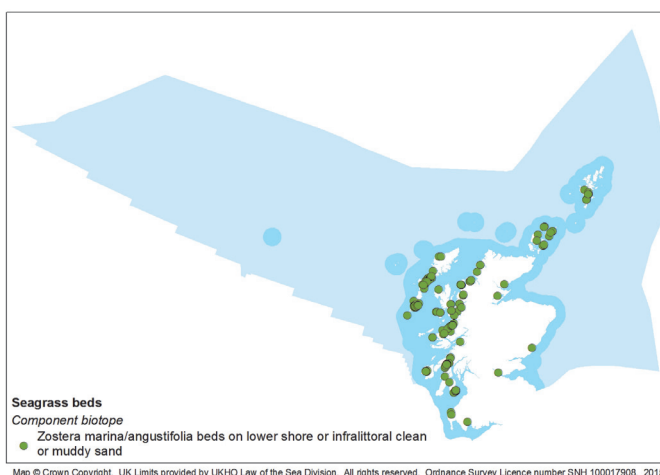
No sub-component biotopes

Component biotope name

ZOSTERA MARINA/ANGUSTIFOLIA BEDS ON LOWER SHORE OR INFRALITTORAL CLEAN OR MUDDY SAND (SS.SMp.SSGr.Zmar)

Image

Image: SNH

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 sea bed (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 10s of m² to several km², 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. These beds provide a natural sea defence by binding sediment and absorbing the energy of incoming waves. Subtidal seagrass beds provide nursery areas for commercially important fish species (including flatfish and pollock), and are a preferred habitat for other species, such as stalked jellyfish.

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 is found throughout the north Atlantic and north Pacific and in the Mediterranean and Black Seas. It ranges from the Arctic Circle to the tropics in Baja California, Mexico.

Feature status - Scotland supports 20% of the eelgrass beds in north-west Europe. Seagrass beds are 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 (Mudflats & Sandflats, Subtidal sandbanks, typical of Lagoons, Estuaries, Large shallow inlets and bays)
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

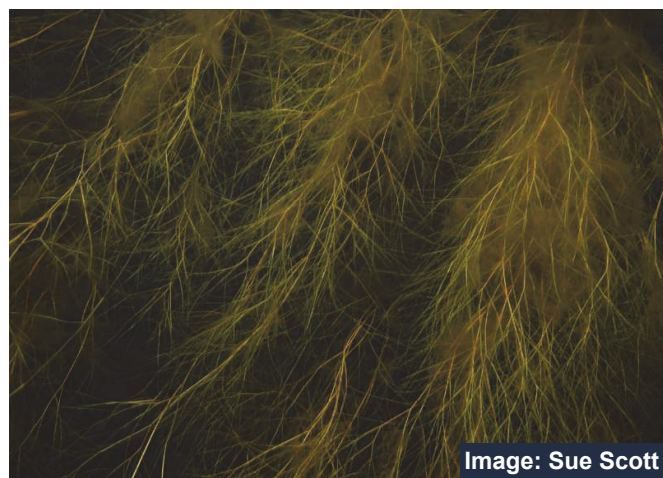
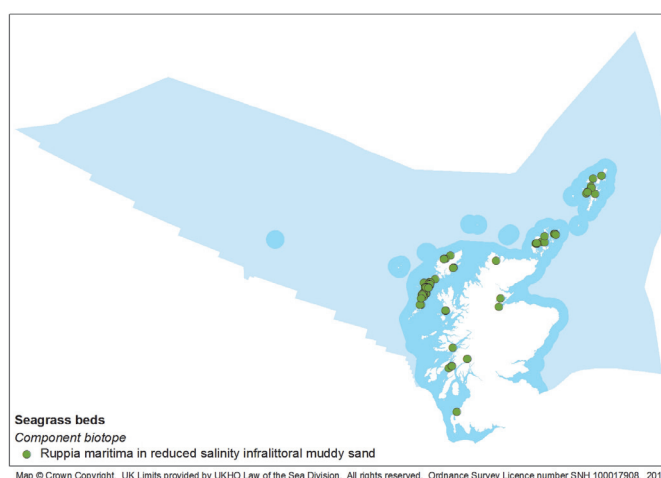
Component biotope name**RUPPIA MARITIMA IN REDUCED SALINITY INFRA-LITTORAL MUDDY SAND (SS.SMp.SSgr.Rup)****Image**

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. *Ruppia* beds are sensitive to physical damage and substratum loss, changes in water flow, wave exposure and turbidity, as well as pollution.

Natural heritage importance

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

Information sources

UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

No sub-component biotopes

Broad habitat

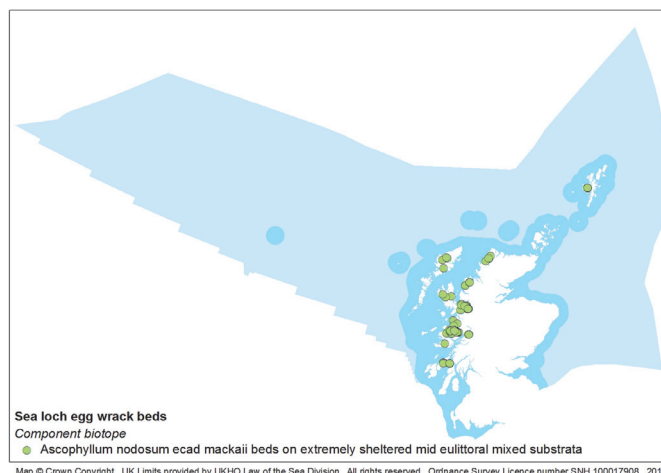
SEA LOCH EGG WRACK BEDS

Image



Image: SNH

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 & Sandflats, typical of Large shallow inlets and bays)
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.

Broad habitat

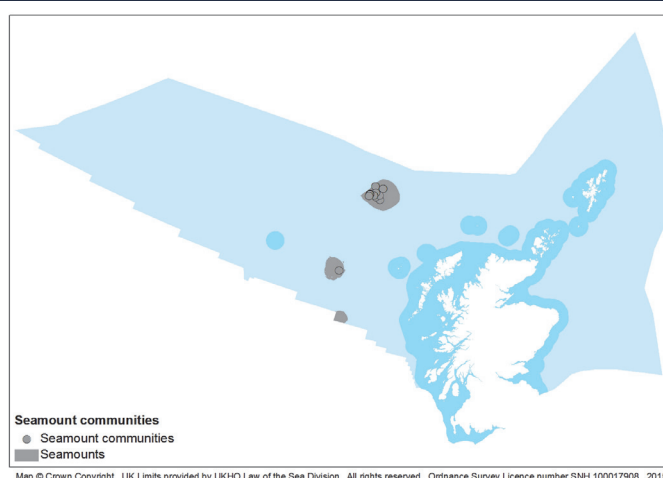
SEAMOUNT COMMUNITIES

Image



Image: JNCC

Distribution



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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 sea floor with peaks that do not reach the water's surface and therefore in Scotland are confined to offshore waters beyond the continental slope, where such depths occur.

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 all 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
Scottish Biodiversity List
UK BAP

Information sources

OSPAR Case Report
Plymouth University Marine Institute
UK BAP Habitat Definitions

Component biotopes in Scottish waters

Seamounts, knolls and banks - no Marine Habitat Classification code. A6.72 (EUNIS).

Broad habitat

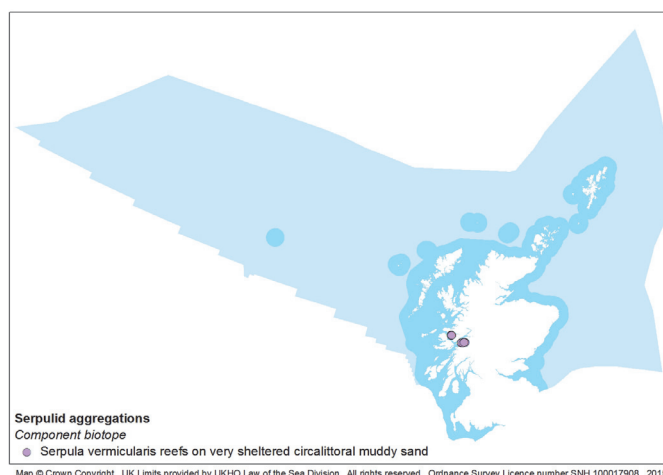
SERPULID AGGREGATIONS

Image



Image: SNH

Distribution



Feature description

Characteristics - Dense clumps or reefs of white chalky tubes, each containing a *Serpula vermicularis* worm. These aggregations can reach over 1m in height and 2m wide, with individual tubes, each up to 5mm wide and 15cm in length, growing on top of one another anchored to pebbles, shells or stones in muddy sediment. When feeding, the worms extend their beautiful red, white or orange feathery tentacles. Serpulid aggregations provide solid substrata in an otherwise sedimentary area. Sea squirts, sponges, sea fans and seaweeds grow on the tubes, while the complex three dimensional network of calcareous tubes provides homes for crabs, shrimp, squat lobster, brittlestars, starfish, worms and snails. The serpulid aggregations also provide refuge for a number of fish species.

Environmental preferences - Sheltered to extremely sheltered sea lochs or inlets with weak or very weak water flow, at depths of 6-10m.

Scottish distribution - Loch Creran, Argyll and Loch Teacuis (an arm of Loch Sunart), Morvern.

Wider distribution - Only recorded from a few other locations worldwide, Killary Harbour and Ardbear Lough in Ireland and Mar Piccolo, a lagoon near Taranto in Italy.

Feature status - Scotland supports all the UK records of this habitat. The reefs in Loch Creran are the best example and the largest extent of this habitat in the world. The first accounts described serpulid reefs in 1882 standing above the surface of Loch Creran at low tide. This suggests their distribution has declined over the last 120 years. The extent of the reefs within Loch Creran appeared to be stable through the 1990s, however recent survey work indicates there has been a significant decline in condition since 2005. Small aggregations of serpulid worms were discovered in Loch Teacuis in 2006, but these have also since declined. Serpulid aggregations in Loch Sween became extinct some time during the 1990s for reasons that are still not understood. Serpulid aggregations are extremely sensitive to physical disturbance and abrasion, and are also sensitive to changes in water flow and salinity. Threats to serpulid aggregations include demersal fishing activities, anchoring (e.g. boats and aquaculture facilities) and coastal developments that alter water flow.

Natural heritage importance

EC Habitats Directive Annex I (Reefs, typical of Large shallow inlets and bays)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
MarLIN
SAMS - serpulid reef project
Scottish Environment LINK
SNH serpulid reef leaflet

Component biotopes in Scottish waters

Serpula vermicularis reefs on very sheltered circalittoral muddy sand - **SS.SBR.PoR.Ser.**

Broad habitat

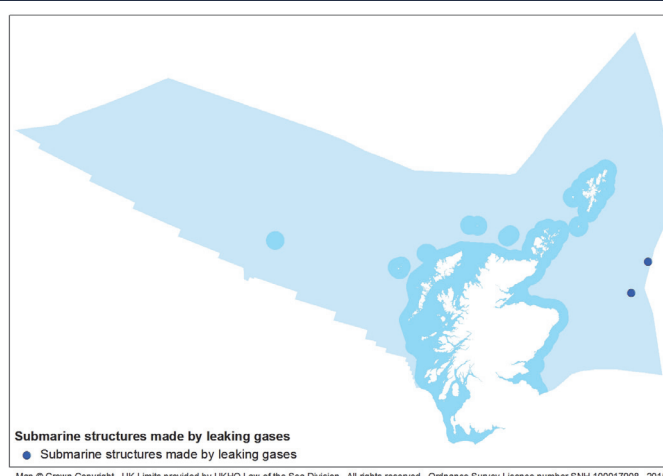
SUBMARINE STRUCTURES MADE BY LEAKING GASES

Image



Image: JNCC

Distribution



Feature description

Characteristics - Submarine structures, consisting of rocks, slabs and pillars that may reach up to 4m in height. These formations are made from sandstone bound by carbonate cement, a by-product of the bacterial breakdown of leaking gases (mainly methane) rising up through the sea bed. Surrounding bacterial mats indicate areas of active gas seepage. The sandstone structures shelter diverse animal communities, with numerous species utilising the cracks and crevices. Crustaceans, sea anemones and corals may be present. This habitat provides a feeding ground (and shelter) for a variety of deep water fish, including some commercially important species e.g. cod, haddock, wolf-fish, ling and tusk.

Environmental preferences - Within UK waters, this habitat is found in fully saline waters at depths ranging from 100-150m, primarily associated with large pockmarks (depressions in the sea bed) formed through the expulsion of shallow natural gas deposits.

Scottish distribution - The Scanner and Braemar pockmarks contain examples of submarine structures made by leaking gases and are found offshore to the east of Scotland. However, the known extent of this habitat type in Scottish waters may increase in the future with gas seeps and pockmarks recorded from a number of locations on the west coast within territorial waters.

Wider distribution - The Irish Sea submarine structures are well studied with at least two described examples (Texel 11 and Holden's Reef). Other potential sites include Coding Fault Zone and Kish Bank in the Irish Sea.

Feature status - This habitat has only recently been discovered and as yet is poorly studied. The reefs are susceptible to damage by bottom trawling, oil and gas development and carbonate sand mining for the aggregate industry. The predicted levels of ocean acidification associated with climate change may have detrimental effects on carbonate mound structures.

Natural heritage importance

EC Habitats Directive Annex I (Submarine structures made by leaking gases)

Information sources

JNCC Marine SACs

Component biotopes in Scottish waters

No component biotopes

Broad habitat

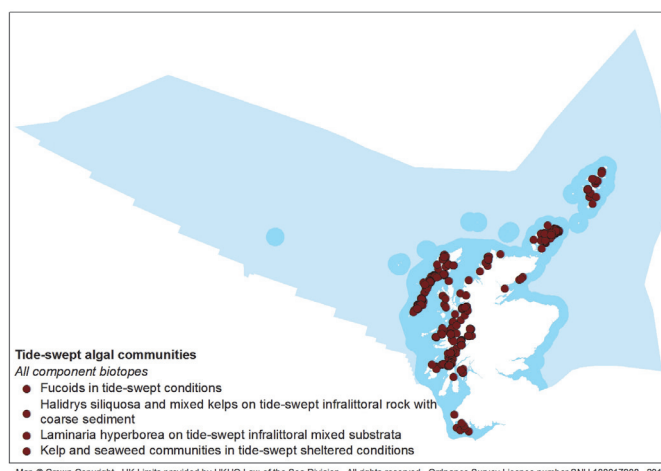
TIDE-SWEPT ALGAL COMMUNITIES

Image



Image: Ben James

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. The kelps and fucoids form a canopy that provides shelter for an understorey 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 - The different component biotopes may be subject to kelp and wrack harvesting, which could have effects on habitat structure and species diversity. Any activity that reduces water flow (e.g. coastal development or renewable energy devices) will adversely affect these habitats.

Natural heritage importance

EC Habitats Directive Annex I
 Scottish Biodiversity List
 UK BAP

Information sources

UK BAP Habitat Definitions

Component biotopes in Scottish waters

Fucoids in tide-swept conditions - **LR.HLR.FT**, including: **LR.HLR.FT.AscT**; **LR.HLR.FT.FserT** & **LR.HLR.FT.FserTX**.

Halidrys siliquosa and mixed kelps on tide-swept infralittoral rock with coarse sediment - **IR.HIR.KSed.XKHal**.

Kelp and seaweed communities in tide-swept sheltered conditions - **IR.MIR.KT**, including: **IR.MIR.KT.LdigT**; **IR.MIR.KT.XKT** & **IR.MIR.KT.XKTX**.

Laminaria hyperborea on tide-swept infralittoral mixed substrata - **IR.MIR.KR.LhypTX**, including: **IR.MIR.KR.LhypTX.Ft** & **IR.MIR.KR.LhypTX.Pk**.

Component biotope name

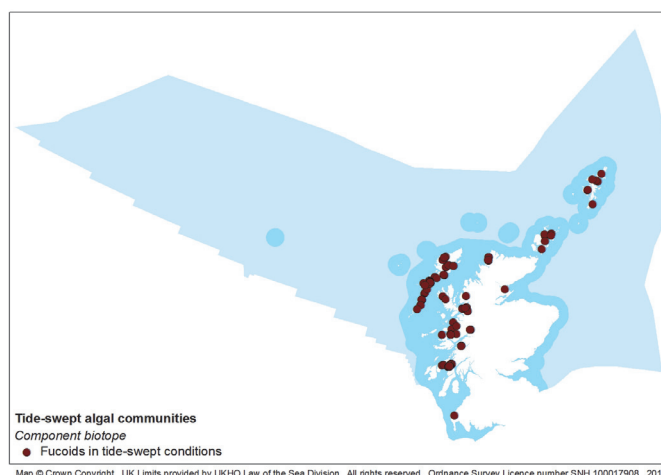
FUCOIDS IN TIDE-SWEPT CONDITIONS (LR.HLR.FT)

Image



Image: SNH

Distribution



Feature description

Characteristics - A tide-swept algal biotope 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 - 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, typical of Large shallow inlets and bays)
Scottish Biodiversity List
UK BAP

Information sources

JNCC Marine Habitat Classification
UK BAP Habitat Definitions

Sub-component biotopes in Scottish waters

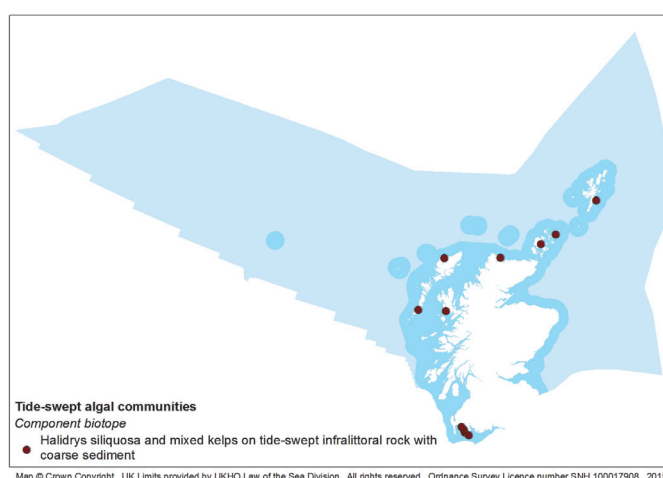
Ascophyllum nodosum, sponges and ascidians on tide-swept mid eulittoral rock - **LR.HLR.FT.AscT**.
Fucus serratus, sponges and ascidians on tide-swept lower eulittoral rock - **LR.HLR.FT.FserT**.
Fucus serratus with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata - **LR.HLR.FT.FserTX**.

Component biotope name

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

Image

Image: Ben James

Distribution**Feature description**

Characteristics - A tide-swept algal biotope 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 relatively few records of this biotope in Scotland but it is likely to be under-recorded. Confirmed from Luce Bay (north Solway), Loch Brittle (Skye), the Sound of Barra, Loch Roag (Lewis), Loch Eriboll, Bay of Firth and Otters Wick in Orkney, as well as Noss Sound in Shetland. Also known to be present in Loch Sween.

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 - Activities that reduce water flow (e.g. coastal development and the emplacement of artificial structures) will adversely affect these habitats.

Natural heritage importance

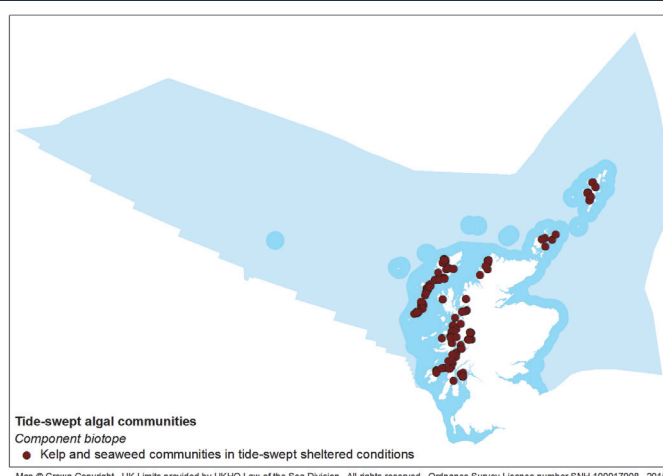
EC Habitats Directive Annex I (Reefs)
Scottish Biodiversity List
UK BAP

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 curv (*Laminaria hyperborea*) and sugar kelp (*Saccharina latissima*) 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 - 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 this biotope.

Natural heritage importance

EC Habitats Directive Annex I (Reefs, typical of Large, Shallow Inlets & Bays)
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**.
Mixed kelp with foliose red seaweeds, sponges and ascidians on sheltered tide-swept infralittoral rock - **IR.MIR.KT.XKT**.
Mixed kelp and red seaweeds on infralittoral boulders, cobbles and gravel in tidal rapids - **IR.MIR.KT.XKTX**.

Component biotope name

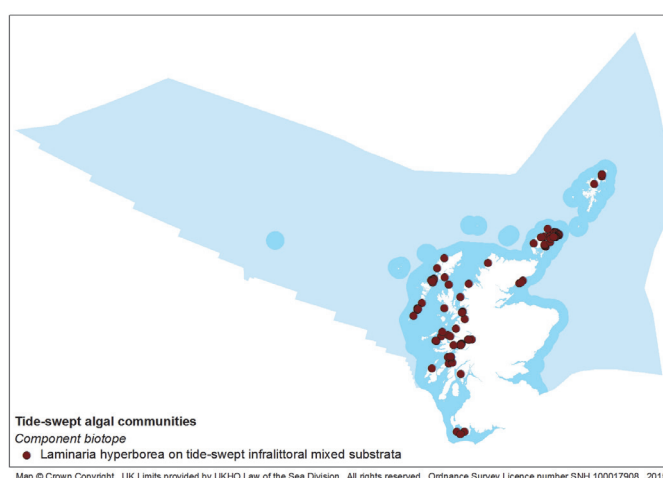
LAMINARIA HYPERBOREA ON TIDE-SWEPT INFRALITTORAL MIXED SUBSTRATA (IR.MIR.KR.LhypTX)

Image



Image: Sue Scott

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 understory of red seaweeds on the rocks together with sponges, sea squirts, sea mats and sea anemones. Red seaweeds, sea squirts, sea fans, sea mats and sea chervil also grow on the kelp itself. The biotope 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 loch 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 - Scottish records are of national importance as most of the UK's records of this biotope occur in Scotland. This biotope may be subject to localised harvesting of the kelp with effects on habitat composition 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
MarLIN
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.**

Laminaria hyperborea park and foliose red seaweeds on tide-swept lower infralittoral mixed substrata - **IR.MIR.KR.LhypTX.Pk.**

Broad habitat

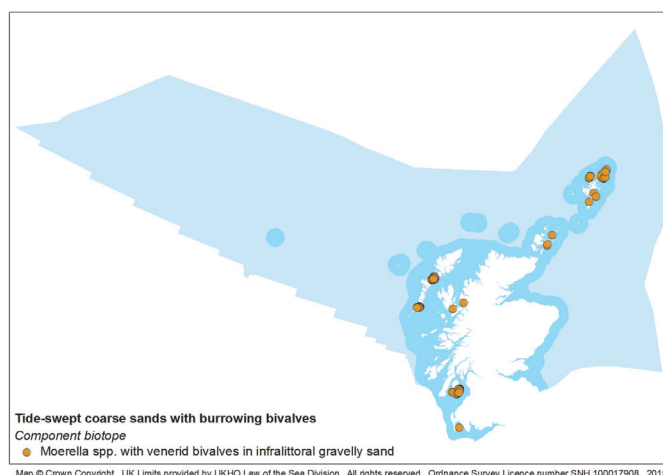
TIDE-SWEPT COARSE SANDS WITH BURROWING BIVALVES

Image



Image: Paul Kay

Distribution



Feature description

Characteristics - Tide-swept coarse and gravelly sands 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 (typically 0-20m) on open coasts and in the mouths of sea lochs, subject to moderately strong tidal water movement. Recent data suggests that the community associated with this biotope may also be present in waters deeper than is characteristic of infralittoral biotopes.

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 sparsely distributed around the rest of the UK and Ireland, with a 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

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

Information sources


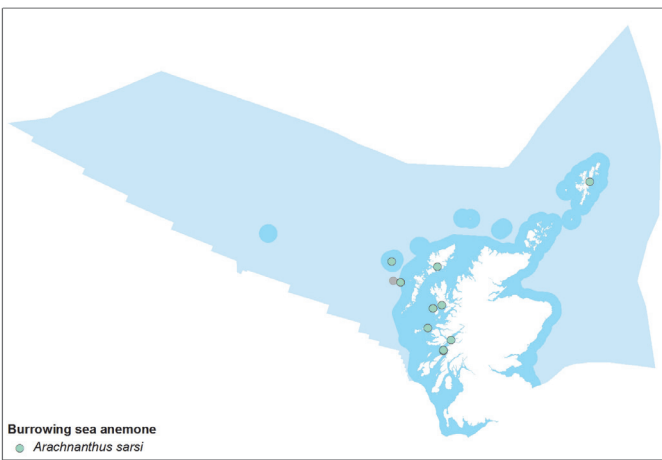
JNCC Marine Habitat Classification
MarLIN

Component biotopes in Scottish waters

Moerella spp. (now *Tellina* spp.) with venerid bivalves in infralittoral gravelly sand -


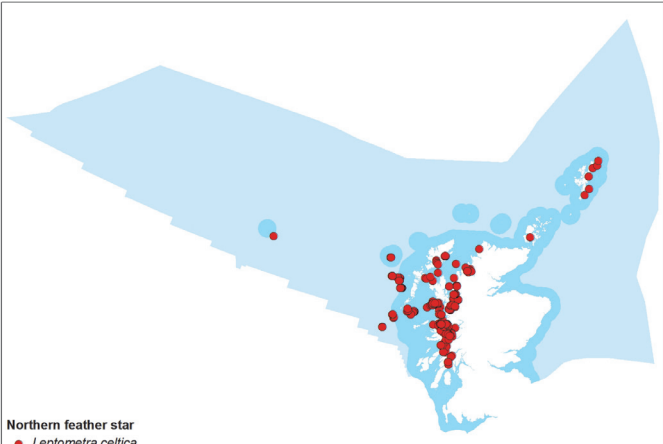
SS.SCS.ICS.MoeVen.

*including examples that lie outside the typical depth range of the biotope.


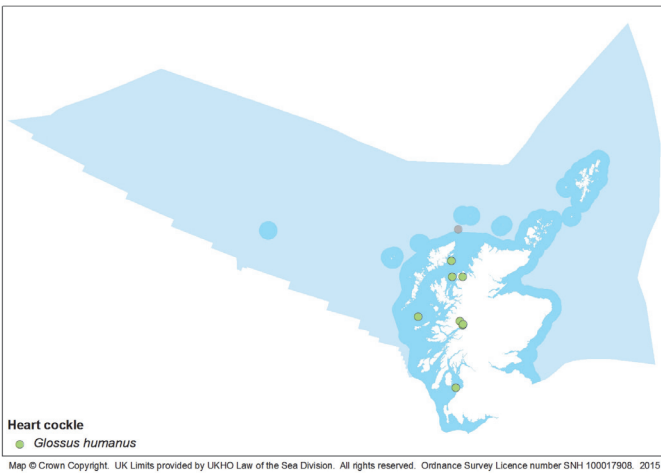
LOW OR LIMITED MOBILITY SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
BURROWING SEA ANEMONE - <i>ARACHNANTHUS SARSI</i>		Sea anemones, sea fans and seapens
<i>Other name(s)</i> - scarce tube-dwelling anemone		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Bernard Picton</p>	 <p>Burrowing sea anemone ● <i>Arachnanthus sarsi</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - A large sea anemone, up to 20cm high when fully expanded, that lives in a tube in the sea bed. 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.</p> <p>Habitat - Lives in a parchment-like tube, into which it can rapidly withdraw, buried in mud, sand or shelly mud sediment at 10-36m depth.</p> <p>Feeding - Feeds on plankton and suspended organic particles.</p> <p>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.</p> <p>Wider distribution - Recorded from northern UK, Ireland and Norway.</p> <p>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.</p>		
Natural heritage importance		Information sources
Scottish Biodiversity List UK BAP		Encyclopedia of Marine Life MarLIN


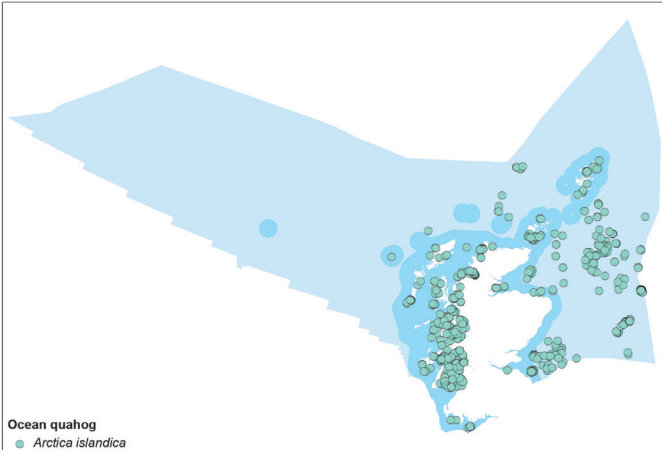
LOW OR LIMITED MOBILITY SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
PINK SEA FINGERS - <i>ALCYONIUM HIBERNICUM</i>		Sea anemones, sea fans and seapens
<i>Other name(s)</i> - pink soft coral		<i>Recent synonym</i> - <i>Parerythropodium coralloides</i>
Image	Distribution	
	 <p>Pink sea fingers ● <i>Alcyonium hibernicum</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SN41 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - Grows in small colonies forming pink, thick, fleshy masses of irregular shaped, stout, finger-like projections, from which it gets its name. Colonies are up to 4cm high and 5cm wide. Extended polyps look star-like and have eight tentacles. Colonies may densely cover several square metres of rock.</p> <p>Habitat - Found on shaded vertical or overhanging rock surfaces between 1-30m depth, in areas of good water movement where overhangs provide some shelter from wave action.</p> <p>Feeding - Feeds on plankton and suspended organic particles. Polyps are retracted when not feeding.</p> <p>Scottish distribution - Recorded from the west coast (Firth of Lorn, Sound of Mull, Isle of Muck) and St Kilda.</p> <p>Wider distribution - Largely restricted to western coastlines of the British Isles, the Isle of Man and Ireland, but some records for north-western France.</p> <p>Feature status - Almost 50% of the global records occur in Scotland. Pink sea fingers have a restricted distribution and local populations are unlikely to recover if lost. Pink sea fingers may be affected by synthetic contaminants.</p>		
Natural heritage importance		Information sources
		Encyclopedia of Marine Life MarLIN


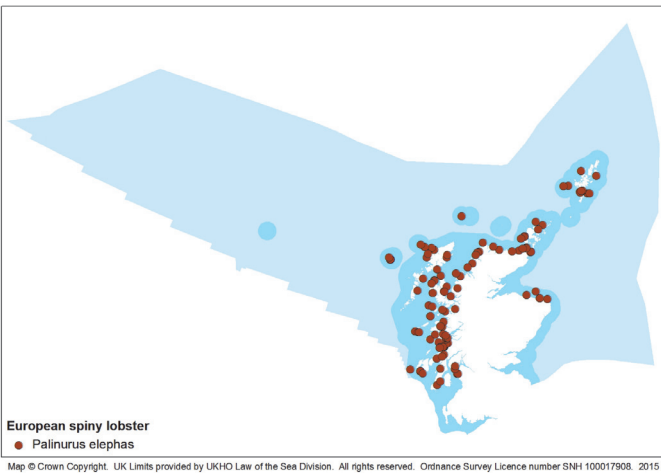
LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL WATERS
Common name - <i>Scientific name</i>	Species group
WHITE CLUSTER ANEMONE - <i>PARAZOANTHUS ANGUICOMUS</i>	Sea anemones, sea fans and seapens
<i>Other name(s)</i> - white creeping anemone	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Paul Kay</p>	 <p>White cluster anemone ● <i>Parazoanthus anguicomus</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - A small colonial sea anemone that grows on rock or on other animals in small clusters. Each anemone can grow up to 2.5cm tall and 8mm in diameter and typically has 40-42 short pointed tentacles. It is white, beige or pink in colour, but the column may be white or encrusted with sand grains giving it a grainy appearance. Each cluster is essentially a colony of many individual anemones growing from the same base. The clusters may reach high densities.</p> <p>Habitat - Grows on other species (e.g. sponges, worm tubes, sea squirts and hard corals such as <i>Lophelia pertusa</i>) and on bedrock, boulders and wrecks. Often recorded in dark places such as overhangs or cave roofs that are sheltered from wave action. It is usually found at depths of at least 400m but can occur as shallow as 20m.</p> <p>Feeding - Feeds on plankton and suspended organic particles.</p> <p>Scottish distribution - Primarily on the west coast and around the Hebrides but with scattered records from the east and west coast of Shetland.</p> <p>Wider distribution - South from Scotland to western Ireland, Lundy and Brittany. It may be widespread in deep water off the continental shelf.</p> <p>Feature status - A large proportion of the records of this otherwise scarce sea anemone occur in Scotland. It is likely to be more widespread but under-recorded in deep water. Populations growing amongst coral rubble habitats may be threatened by mobile demersal fishing activities.</p>	
Natural heritage importance	Information sources
	Encyclopaedia of Marine Life Hexacoralians of the World MarLIN

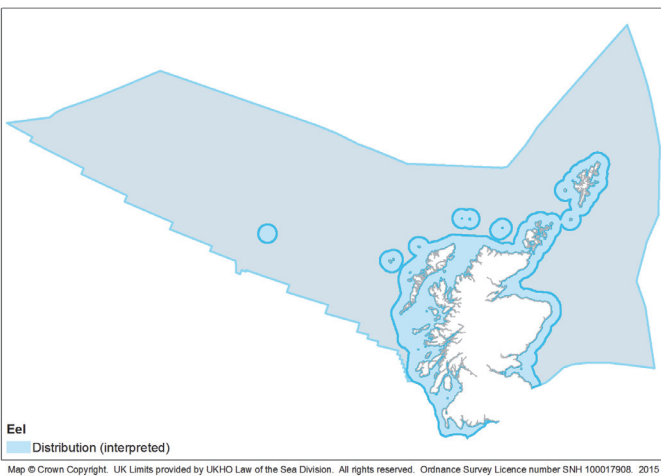
LOW OR LIMITED MOBILITY SPECIES		TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
NORTHERN FEATHER STAR - <i>LEPTOMETRA CELTICA</i>		Starfish and feather stars
<i>Other name(s)</i> - none		<i>Recent synonym</i> - none
Image		Distribution
 <p>Image: Christine Howson / SNH</p>		 <p>Northern feather star ● <i>Leptometra celtica</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description		
<p>Characteristics - Feather stars are relatives of starfish. Each of the northern feather star's 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 a vertical fan to catch food carried on the passing currents.</p> <p>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.</p> <p>Feeding - Feeds on plankton and suspended organic particles.</p> <p>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.</p> <p>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.</p> <p>Feature status - 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.</p>		
Natural heritage importance		Information sources
		<p>Encyclopaedia of Marine Life</p> <p>MarLIN</p>


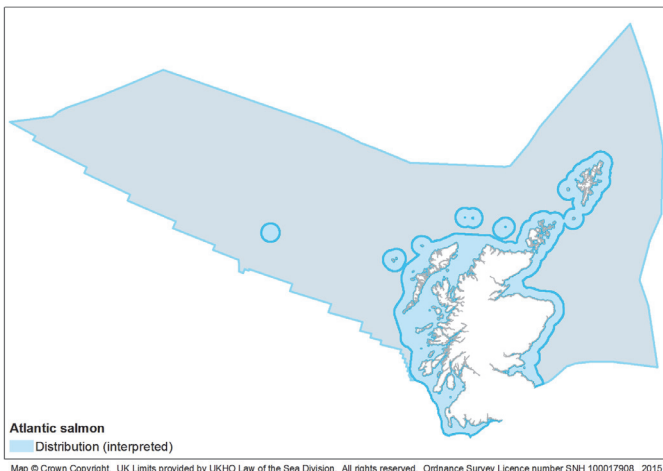
Low OR Limited Mobility Species	Territorial and Offshore Waters
Common name - <i>Scientific name</i>	Species group
FAN MUSSEL - <i>ATRINA FRAGILIS</i>	Snails, clams, mussels and oysters
<i>Other name(s)</i> - sea wings, fan shell	<i>Recent synonym</i> - <i>Atrina pectinata</i>
Image	Distribution
 <p>Image: Sue Scott</p>	 <p>Fan mussel ● <i>Atrina fragilis</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>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.</p> <p>Habitat - Found embedded in lower intertidal and subtidal muds, sandy muds or gravels, at sites sheltered from water movement down to 400m depth.</p> <p>Feeding - Feeds on plankton and suspended organic particles.</p> <p>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. Further survey work in 2011 has established the full extent of the fan mussels in this area.</p> <p>Wider distribution - Found on the western and southern UK coasts, the Scilly Isles, Channel Isles, and south to the Iberian Peninsula.</p> <p>Feature status - Over 50% of recent UK records are from Scottish waters. 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.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981	Encyclopaedia of Marine Life MarLIN


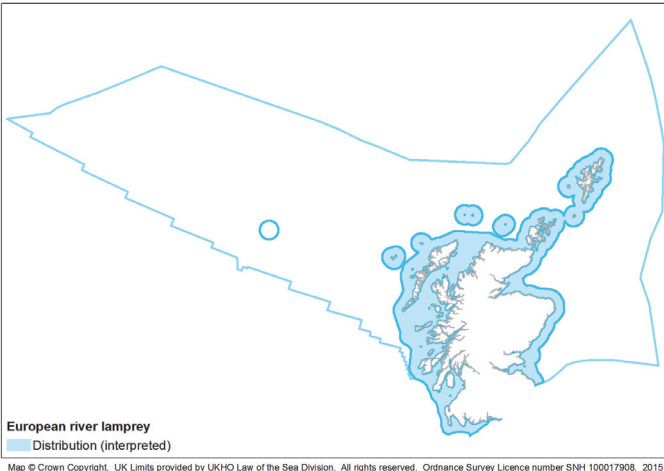
LOW OR LIMITED MOBILITY SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
HEART COCKLE - <i>GLOSSUS HUMANUS</i>		Snails, clams, mussels and oysters
<i>Other name(s)</i> - ox heart cockle, ox heart clam		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: National Museum Wales</p>	 <p>Heart cockle ● <i>Glossus humanus</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>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.</p> <p>Habitat - May be found in soft muds and sands below 7m depth, but is considered a deep water species more usually found below 50m depth, in undisturbed sediment. Sometimes associated with the mud around cold-water coral reefs.</p> <p>Feeding - Feeds on phytoplankton and suspended organic particles.</p> <p>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.</p> <p>Wider distribution - Potentially found offshore around all of the British Isles, from Norway and Greenland south to the Adriatic, Iberian Peninsula and the Mediterranean.</p> <p>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.</p>		
Natural heritage importance		Information sources
		Conchological Society NMW Marine Bivalve Shells of the British Isles MarLIN

LOW OR LIMITED MOBILITY SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
OCEAN QUAHOG - <i>ARCTICA ISLANDICA</i>	Snails, clams, mussels and oysters
<i>Other name(s)</i> - Icelandic cyprine, mahogany clam, mahogany quahog, black quahog, black clam	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Paul Kay</p>	 <p>Ocean quahog ● <i>Arctica islandica</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - The ocean quahog is considered to be the longest living mollusc with one individual reported to have lived for 507 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.</p> <p>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.</p> <p>Feeding - Filter feeds on phytoplankton and organic particles.</p> <p>Scottish distribution - Found around all Scottish coasts. Mainly offshore in the east of Scotland and the northern North Sea but closer inshore along the west coast.</p> <p>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 east Atlantic and from Labrador to North Carolina in the west.</p> <p>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.</p>	
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 - <i>Scientific name</i>		Species group
EUROPEAN SPINY LOBSTER - <i>PALINURUS ELEPHAS</i>		Lobsters and sand hoppers
<i>Other name(s)</i> - common spiny lobster, red lobster, crayfish, crawfish		<i>Recent synonym</i> - <i>Palinurus vulgaris</i>
Image		Distribution
 <p>Image: Paul Kay</p>		 <p>European spiny lobster ● <i>Palinurus elephas</i></p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description		
<p>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.</p> <p>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.</p> <p>Feeding - Feeds at night on echinoderms (starfish and sea urchins), small snails, bivalve molluscs, microalgae, shrimp larvae, sea mats, worms, and detritus.</p> <p>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.</p> <p>Wider distribution - Found throughout the UK, although after Scotland most records occur in the south-west. It also ranges from Norway to Morocco and the Mediterranean.</p> <p>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 are insufficient data available to assess population trends in Scottish waters. The species is sensitive to over-exploitation. Localised fisheries exist for European spiny lobsters, which are traditionally taken in pots and creels. More recent capture methods such as tangle netting are likely to put additional pressure on the species. European spiny lobsters are also likely to be sensitive to changes in water quality.</p>		
Natural heritage importance		Information sources
IUCN Red List (Vulnerable) Scottish Biodiversity List UK BAP		Encyclopaedia of Marine Life MarLIN


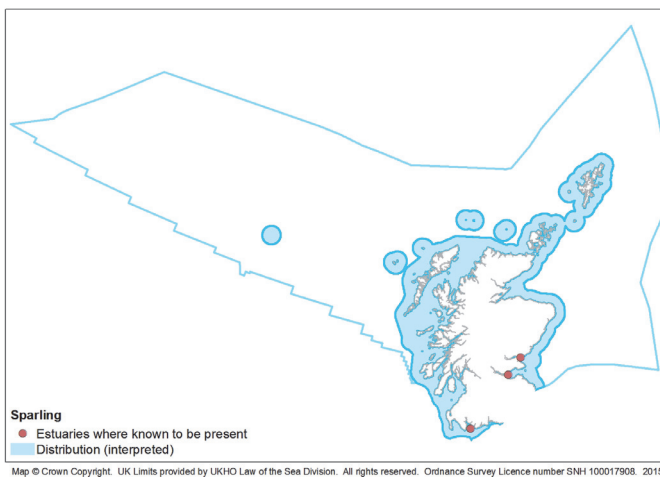
MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
EUROPEAN EEL - <i>ANGUILLA ANGUILLA</i>		Bony fish (catadromous)
<i>Other name(s)</i> - easgann		<i>Recent synonym</i> - none
Image		Distribution
 <p>Image: Keith Hiscock</p>		 <p>Eel Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description		
<p>Characteristics - Has an elongate cylindrical snake-like body that grows to about 50cm in length but in exceptional circumstances can reach 110cm and a weight of 5kg. Adult males are usually slightly smaller than females. Although colourless when they first arrive in coastal waters, older fish are a black, brown or dark olive green with a paler yellow underside. This changes to silver as they reach maturity. The top and bottom fins merge at the tail fin. Its skin is typically slimy and hence slippery to the touch.</p> <p>Habitat - The life cycle of this fish includes fresh water and marine environments. Unpigmented juveniles (known as 'glass' eels) enter estuaries from the sea in early spring. Many migrate to fresh water habitats but they can also be found in estuaries and coastal waters. They can stay in fresh water or coastal areas for up to 40 years before they migrate to the Sargasso Sea in the western Atlantic to spawn. Spawning takes place only once - the eels do not return to European waters.</p> <p>Feeding - Feeds on invertebrates and small fish.</p> <p>Scottish distribution - Widely distributed throughout Scotland in all types of fresh water with a connection to the sea as well as in estuarine and coastal waters.</p> <p>Wider distribution - Has a wide distribution in rivers, streams and lakes around the coasts of Britain and Ireland. Distribution extends throughout Europe and into parts of North Africa. The only known spawning site for the species is in the Sargasso Sea in the western Atlantic.</p> <p>Feature status - The eel has experienced catastrophic decline throughout Europe including in the UK. Numbers of returning elvers (young eels) entering European rivers have reduced to less than 5% of pre-1980 levels and the species is already considered to be vulnerable, endangered, threatened or extinct in 11 European countries. Both adults and juveniles are commercially targeted in fresh and estuarine waters. It is currently listed as critically endangered on the IUCN red list. The EU and the Scottish Government have adopted eel management plans which include habitat restoration measures.</p>		
Natural heritage importance		Information sources
CITES Appendix II IUCN Red List (Critically endangered) OSPAR T&D Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase MarLIN Scottish Government Joint EIFAAC/ ICES/ GFCM Working Group on Eels

MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
ATLANTIC SALMON - <i>SALMO SALAR</i>		Bony fish (anadromous)
<i>Other name(s)</i> - bradan		<i>Recent synonym</i> - none
Image	Distribution	
 <div>Image: Lorne Gill / SNH</div>	 <div>Atlantic salmon Distribution (interpreted)</div> <div>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</div>	
Feature description		
<p>Characteristics - Adult fish vary considerably in size depending on how long they spend at sea. Fish which have spent only one winter at sea (grilse) are typically 40-75cm in length and weigh 1-5kg. Fish which spend two or more years at sea (multi-sea winter) can be considerably larger, weighing 10kg or more. At sea it is blue-green in colour, with a silvery coating and small black spots along the head and above the lateral line. In fresh water, the silvery coating is lost over time and it becomes mottled, or reddish brown in colour and its spots enlarge. Adult males develop a pronounced hook, or 'kype' on their lower jaws. Juvenile salmon are typically brownish in colour with distinctive parr markings along the flanks. As pre-adults, salmon smolts lose their parr markings and become silver in appearance.</p> <p>Habitat - The species is anadromous, meaning they breed in fresh water where young can remain for 1 to 4 years before migrating to the ocean. After 1 to 3 years at sea, they return to fresh water to spawn, either as grilse or multi-sea-winter fish. The majority of their marine life is spent in distant waters around the Norwegian Sea, the waters off south-west Greenland, and other sub-arctic feeding areas.</p> <p>Feeding - Feeds mainly on marine fish and crustaceans.</p> <p>Scottish distribution - Found all around the coast of Scotland, and in ~389 Scottish river systems, although most rivers will contain several genetically distinct populations.</p> <p>Wider distribution - Found in most parts of the UK. Ranges from north Portugal to Iceland and Norway, and the north-east coast of North America and Canada. A substantial proportion of the worldwide population spawn in Scotland, Ireland, Iceland and Norway.</p> <p>Feature status - In general, the available data suggest that up until 2010 the overall number of Atlantic salmon returning to Scottish rivers was increasing. However since then the recorded rod catch dropped in each subsequent year and the 2014 catch was one of the lowest on record. The number of spring salmon returning to rivers has been in decline since the 1950s and, although numbers have generally stabilised, they remain at historically low levels. The national trends can mask the fact that some local declines, and even extinctions, have occurred over the last century. Atlantic salmon are affected by poor water quality, over-abstraction, habitat degradation, barriers to migration and climate change. Both the quality of fresh water habitat, and access to spawning areas has improved in recent decades and it is clear that marine survival is a key factor in local declines. Marine survival and adult recruitment in Atlantic salmon depend on post-smolt growth, particularly during the summer and early autumn period. Declining marine survival has been linked to warming conditions in the Northeast Atlantic, while inappropriate stocking practices, aquaculture and wild fisheries have also been implicated.</p>		
Natural heritage importance		Information sources
EC Habitats Directive (Annex II & V in fresh water) IUCN Red List (Lower risk - least concern) OSPAR T&D Scottish Biodiversity List UK BAP		Atlantic Salmon Trust FAO Species Fact Sheet Fishbase North Atlantic Salmon Conservation Organization ICES Working Group on North Atlantic Salmon


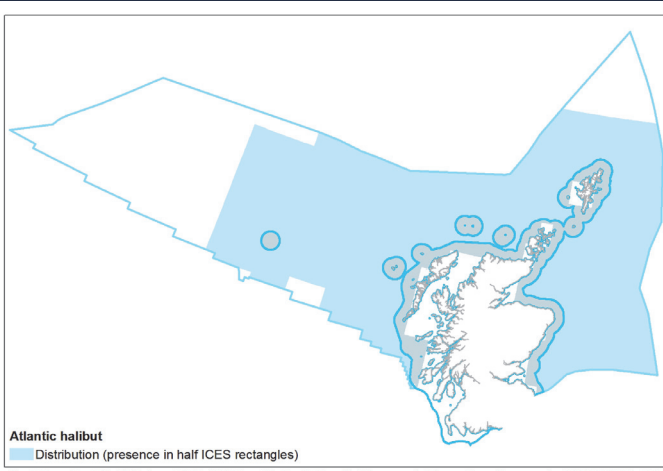
MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
EUROPEAN RIVER LAMPREY - <i>LAMPETRA FLUVIATILIS</i>		Bony fish (anadromous)
<i>Other name(s)</i> - lampfern		<i>Recent synonym</i> - <i>Petromyzon fluviatilis</i>
Image	Distribution	
 <p>Image: Brian Morland</p>	 <p>European river lamprey Distribution (interpreted)</p> <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH100017908. 2015</p>	
Feature description		
<p>Characteristics - Has an elongated body shape resembling an eel and can grow to 30-40cm in length. Green-grey in colour with a white underside, they have no scales and seven gill holes on each side of the head behind the eye. The mouth of the river lamprey has no jaws but is shaped like a sucker and lined with small teeth.</p> <p>Habitat - The species is mainly anadromous, meaning they breed in fresh water but spend part of their life cycle in the sea. Juveniles, known as ammocoetes, live buried in the sediments of rivers for several years before metamorphosing and moving downstream to estuarine habitats and eventually the sea. River lampreys stay at sea for up to 18 months before returning to fresh waters between October and December to spawn (March and April). Populations that are purely fresh water resident are rare in Europe but one exists in Scotland in Loch Lomond.</p> <p>Feeding - Adults feed on a variety of estuarine fish including flounder, herring and sprat by sucking on their body fluids and some flesh. Once full, they detach. Larger prey may survive, although smaller fish may not.</p> <p>Scottish distribution - Occurs widely around the coastline.</p> <p>Wider distribution - Found throughout the UK and Ireland and in continental Europe from southern Norway to the western Mediterranean Sea.</p> <p>Feature status - Improved riverine access for species such as Atlantic salmon has also benefited river lamprey. Despite their conservation value, little is known of the actual size of the UK population, although recent studies have shown that they are slightly more widespread in Scotland than previously thought. Some of this uncertainty arises from the fact that they do not appear to home to natal rivers in the same way as other migratory fish. Thought to be recovering from an earlier decline across Europe, which was due to declines in water quality and the presence of in-stream barriers. Listed on the IUCN Red List as 'Least concern' but extinct in the Mediterranean.</p>		
Natural heritage importance		Information sources
EC Habitats Directive (Annexes II & V in fresh water). IUCN Red List (Least concern) Scottish Biodiversity List UK BAP		Conserving Natura 2000 Rivers Fishbase MarLIN


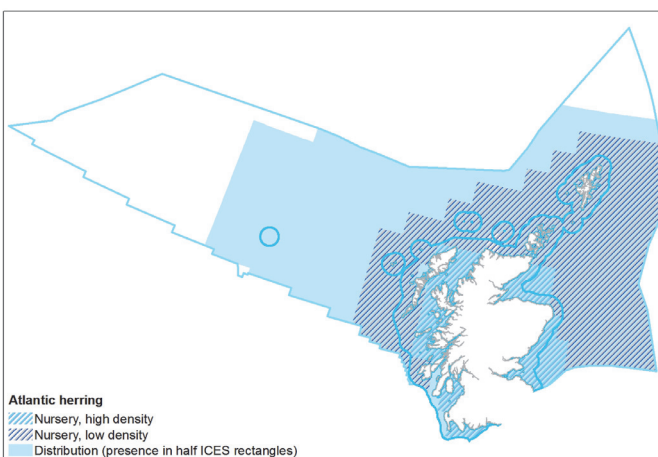
MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
SEA LAMPREY - <i>PETROMYZON MARINUS</i>		Bony fish (anadromous)
<i>Other name(s)</i> - none		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Brian Morland</p>	 <p>Sea lamprey Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - The largest of the British lampreys, the normal adult length is around 50cm although they may exceptionally reach 1m. A cylindrical body except at the tail which is laterally compressed. Colour varies greatly with age. Adults are brownish grey with extensive black mottling. Body colour lightens to a golden brown or orange at spawning time. The skin is smooth and scaleless. Moderately sized eyes positioned on each side of the head just behind a single nostril and in front of seven pairs of gill openings. An overhung mouth in the form of a large circular sucker containing numerous hard, sharp teeth arranged in concentric rows.</p> <p>Habitat - The species is mainly anadromous, meaning they breed in fresh water but spend part of their life cycle in the sea. Juveniles, known as ammocoetes, live buried in silty river sediments for several years before metamorphosing and moving downstream to estuarine habitats and eventually the sea. They spend up to three years feeding at sea before migrating into rivers during the spring and early summer to spawn in areas of pebble and cobble substrate in late May or June. They die after spawning.</p> <p>Feeding - Adults feed on a wide variety of marine and anadromous fish including cod, herring, haddock, salmon, and sea trout. They attach themselves to the sides of the prey species and rasp away the skin, eating it and the tissue beneath. They have even been seen attached to basking sharks.</p> <p>Scottish distribution - Occurs widely around the Scottish coastline. Relatively little is known about their marine distribution but they have been found in both shallow coastal and deep offshore waters.</p> <p>Wider distribution - Widespread across the UK and Ireland, with records outside of Scotland concentrated in East Anglia and south-west England. Continental Europe, from northern Norway to the western Mediterranean, and eastern North America.</p> <p>Feature status - Improved riverine access for anadromous species has also benefited sea lamprey. Despite their conservation value, little is known of the actual size of the UK population. Long term population declines across Europe, with surveys in the past ten years suggesting recent regional declines in a number of rivers, particularly in the north and west of Scotland. Pressures on the species include reduced water quality, habitat deterioration, obstruction to migration, and climate change.</p>		
Natural heritage importance		Information sources
EC Habitats Directive (Annex II in freshwater) IUCN Red List (Least concern) OSPAR T&D Scottish Biodiversity List UK BAP		ARKive Conserving Natura 2000 Rivers Fishbase OSPAR Case Report


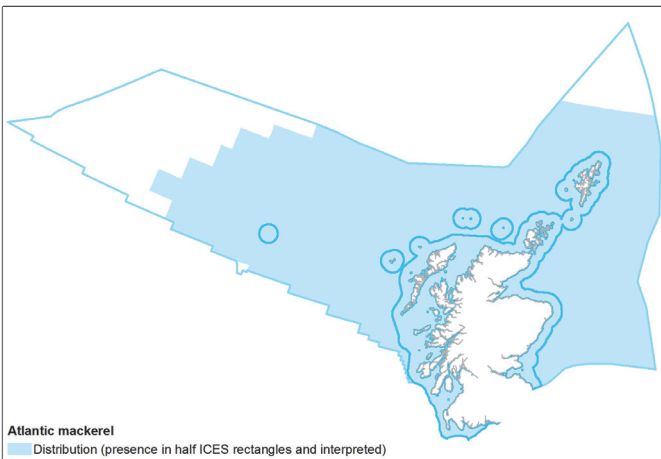
MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
SEA TROUT - <i>SALMO TRUTTA</i>		Bony fish (anadromous)
<i>Other name(s)</i> - trout, breac		<i>Recent synonym</i> - none
Image	Distribution	
		
Feature description		
<p>Characteristics - The sea-running migratory form of the fresh water brown trout. In the British Isles they can grow up to about 1m in length and over 10kg in weight. Individual sizes vary widely between populations. As juvenile fish, they are characterised by the presence of red or orange spots on their flank mostly above the lateral line. Those fish destined to become sea trout change their coloration to silver as they prepare for downstream migration. On their return to spawn in rivers (mainly smaller tributaries) they gradually darken to a reddish brown and male fish develop a hook or 'kype' on their lower jaws.</p> <p>Habitat - Sea trout migrate from rivers to the sea as silvery smolts in spring and some return as mature adults between May to November of their first year at sea. Other fish may return later. Sea trout spawn in late autumn and many will spawn several times during their lifetime. While at sea they tend to remain close to the coast, favouring estuaries. Some do venture further afield, however, and Scottish fish have been captured as far away as Denmark.</p> <p>Feeding - Feeds on a variety of other animals from crustaceans and molluscs to other small fish, especially sprat, sandeels and juvenile herring.</p> <p>Scottish distribution - Widespread in coastal waters and in parts of rivers and fresh water lochs accessible from the sea. Rarely recorded outwith the coastal zone.</p> <p>Wider distribution - Western Europe from northern Portugal to the White Sea and Cheshkaya Gulf, Iceland and the Baltic Sea as well as eastern North America. They have been introduced to other parts of the world, such as Patagonia, the Falkland Islands, New Zealand and Australia.</p> <p>Feature status - Fishery catch data suggest that overall stocks are highly variable but may be declining in many parts of the UK. Like other salmonids, they are affected by poor water quality, over abstraction, habitat degradation, barriers to migration, increased predation, genetic introgression from introduced fish, and climate change. Salmon farming and elevated levels of sea lice infestation have been blamed for declines in some areas of north western Scotland.</p>		
Natural heritage importance		Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP		Atlantic Salmon Trust Moray Firth Sea Trout Project Marine Scotland Science

MOBILE SPECIES	TERRITORIAL WATERS
Common name - <i>Scientific name</i>	Species group
SPARLING – <i>OSMERUS EPERLANUS</i>	Bony fish (anadromous)
<i>Other name(s)</i> – European smelt	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Colin Bean</p>	 <p>Sparling ● Estuaries where known to be present Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics – Sparling is an anadromous species with a long slender appearance. Adults are typically 15-18 cm long, although larger fish (up to 45cm) have been recorded. Sparling are olive-green on the back and sides, have bright silver flanks and a white belly and can appear almost translucent. They have a distinctive smell, similar to fresh cucumbers.</p> <p>Habitat - Occurs in coastal and estuarine waters, rarely far from shore. It migrates into rivers during spring to spawn. Eggs are deposited on sandy or gravelly substrates and vegetation.</p> <p>Feeding - Feeds mainly on shrimps and other small crustaceans, although larger individuals will also prey on small fish.</p> <p>Scottish distribution - Sparling are present in the Cree, Forth and Tay rivers and historically were recorded from at least 12 other river systems from the Clyde southward on the west coast and from the Tay southward on the East coast.</p> <p>Wider distribution - Found around the western coasts of Europe (including the Baltic Sea). Its range extends as far south as Spain.</p> <p>Feature status - Severely declined in Scotland (and throughout the UK). Past over-exploitation has likely contributed to these declines, as they are easy to catch because they enter rivers to spawn in large numbers at discrete periods every year. In addition sparling is sensitive to water pollution, habitat degradation and barriers to migration.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	Fishbase MarLIN Scottish Natural Heritage Natural England Loughs Agency


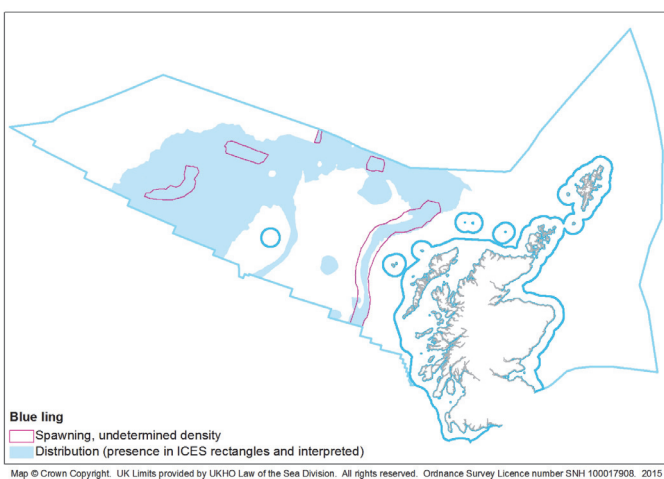
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
ANGLERFISH - <i>LOPHIUS PISCATORIUS</i>	Bony fish
<i>Other name(s)</i> - monkfish, white-bellied monkfish, sea monkfish	<i>Recent synonym</i> - none
Image	Distribution
 <div>Image: SNH</div>	 <div>Anglerfish Nursery, high density Nursery, low density Distribution (presence in half ICES rectangles)</div> <div>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</div>
Feature description	
<p>Characteristics - Anglerfish usually grow up to about 120cm in length but have been recorded as large as 200cm in length and weighing up to 60kg. Their coloration may be variable but is usually a brown or greenish colour with a darker mottling pattern. The body shape is distinctive with a broad, flattened head, wide mouth and short thick set tail. A lure attached to a spine on the head is used to attract prey.</p> <p>Habitat - Usually dwells on sandy or muddy bottoms. They range in depth from very shallow coastal waters as juveniles to at least 1100m as adults. Large, mature individuals used to be distributed at all depths but are now mainly found in deeper offshore waters while juveniles occur in coastal waters typically <150m deep. Capable of wide dispersal due to both long larval duration and occasional adult vertical movements.</p> <p>Feeding - An ambush predator, the anglerfish uses its lure to attract animals within reach of its large mouth. It feeds mostly on smaller fish but a variety of other animals, including lobsters, crabs, squids and even seabirds have also been found in anglerfish stomachs.</p> <p>Scottish distribution - Found around all coasts and in Scottish offshore waters with important nursery areas off the north coast, Orkney, Shetland and the Outer Hebrides. Anglerfish from the west of Scotland and North Sea probably belong to the same population.</p> <p>Wider distribution - Found throughout UK and Irish waters. Also found throughout the north-east Atlantic and Mediterranean from Iceland and the Barents Sea as far south as the North African coast.</p> <p>Feature status - A targeted, commercially important demersal species. The status of the stock in Scottish waters is uncertain but surveys have shown that, following previous declines, abundance has increased slightly in the last two years (2014-2015).</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase Marine Scotland Fish & Shellfish Stocks 2010 MarLIN NOAA NMFS FishWatch


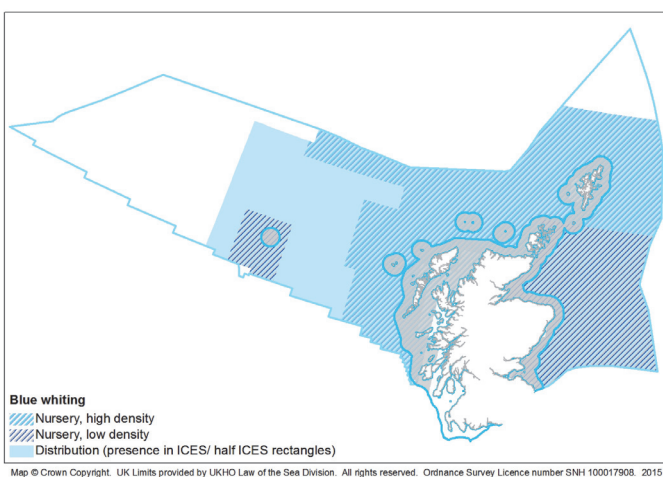
MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
ATLANTIC HALIBUT - <i>HIPPOGLOSSUS HIPPOGLOSSUS</i>	Bony fish
<i>Other name(s)</i> - halibut	<i>Recent synonym</i> - <i>Pleuronectes hippoglossus</i>
Image	Distribution
 <p>Image: Francis Neat</p>	 <p>Atlantic halibut Distribution (presence in half ICES rectangles)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - This species of fish is the largest known flatfish in the world, growing up to 2.5m in length. It is diamond shaped with dark brown to dark olive green coloration on the upper side. The underside is off-white in colour. The eyes of the Atlantic halibut are placed close together.</p> <p>Habitat - A bottom dwelling fish living in temperate areas. Adults are capable of extensive movements using selective tidal stream transport.</p> <p>Feeding - Feeds on marine fish, molluscs and crustaceans.</p> <p>Scottish distribution - Found around all coasts of Scotland and offshore.</p> <p>Wider distribution - Widely distributed across the North Atlantic Ocean. In the east from the Bay of Biscay up to Iceland and eastern Greenland. In the west it ranges from south-western Greenland and Labrador to Virginia.</p> <p>Feature status - As a highly valued commercial fish species with a slow growth rate and late sexual maturity, Atlantic halibut have been seriously affected by overfishing and the species is recognised as 'Endangered' internationally.</p>	
Natural heritage importance	Information sources
IUCN Red List (Endangered) Scottish Biodiversity List UK BAP	Fishbase MarLIN MCS Fish Online

MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
ATLANTIC HERRING - <i>CLUPEA HARENGUS</i>	Bony fish
<i>Other name(s)</i> - Herring	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Marine Scotland Science</p>	 <p>Atlantic herring</p> <ul style="list-style-type: none">Nursery, high densityNursery, low densityDistribution (presence in half ICES rectangles) <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Can grow to 30-45cm in length and is silver in colour, with a darker blue iridescent upper half. The body is deeper than it is wide, with a single fin on the upper side leading to a deeply forked tail.</p> <p>Habitat - Atlantic herring live in shallow waters to depths of up to 200m and are often found in large shoals. Adults spawn on coarse sediments, mainly in shallow nearshore waters. Juveniles occur in shallower, coastal areas before migrating to deeper waters in their second year.</p> <p>Feeding - Feed on small shrimps and zooplankton but can also filter organic particles from the water column.</p> <p>Scottish distribution - Widespread throughout Scottish waters.</p> <p>Wider distribution - Found throughout the UK and Ireland. It is widely distributed through the Atlantic from the Bay of Biscay to Iceland and southern Greenland. Populations also extend eastward to Spitzbergen and Nova Zembla and the Baltic and through to south-western Greenland, Labrador and south to South Carolina.</p> <p>Feature status - Targeted as a commercially important food source throughout the North Atlantic, and an important food fish for other species throughout its range. Various stocks spawn off Scotland. Overfishing resulted in a collapse of the stock in the 1970s and the subsequent closure of the fishery in the North Sea in 1977. In response to management measures and a succession of strong year classes, the stock eventually recovered and the North Sea fishery re-opened in 1983. By 1996, exploitation had increased to such a level that stricter measures were introduced to reduce fishing mortality. ICES currently consider that the main North Sea stock is managed sustainably.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES-FishMap Marine Scotland Fish & Shellfish Stocks 2010 MarLIN MCS Fish online


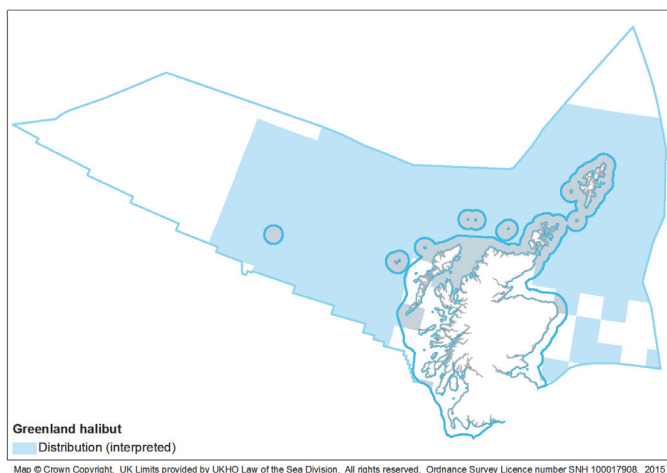
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
ATLANTIC MACKEREL - <i>SCOMBER SCOMBRUS</i>	Bony fish
<i>Other name(s)</i> - joey, mackerel	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Marine Scotland Science</p>	 <p>Atlantic mackerel Distribution (presence in half ICES rectangles and interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - A streamlined body allows this species to swim at speeds of over 20mph. Mackerel generally grow to about 40cm though they may exceptionally grow to 60cm in length and weigh up to 3.4kg. They are silver to metallic blue-green in colour with dark stripes on their backs. They form large dense shoals which can reach to 9km in length and 4km wide, and extend to 40m in depth.</p> <p>Habitat - Found in great numbers in temperate continental shelf areas. They over-winter in deeper waters but move closer to shore to feed in the spring when water temperatures reach between 11-14°C.</p> <p>Feeding - Feed on small fish and zooplankton.</p> <p>Scottish distribution - Widely distributed in Scottish waters.</p> <p>Wider distribution - North-east Atlantic from north-west Africa to Iceland and northern Norway and the north-west Atlantic from Labrador to North Carolina.</p> <p>Feature status - A highly important commercial food species which is caught by commercial fishing vessels as well as anglers. The North Sea spawning component declined significantly in the 1960s due to overfishing and has yet to recover. The much larger western population is within safe biological limits and exploited sustainably. During the 1980s, the western stock changed its migration patterns and large numbers now spend the summer in the North Sea.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES-FishMap Marine Scotland Fish & Shellfish Stocks 2010 MarLIN


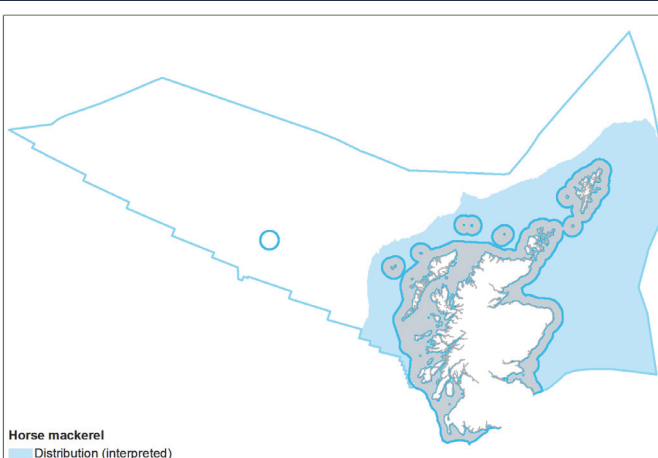
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
BLACK SCABBARDFISH - <i>APHANOPUS CARBO</i> <i>Other name(s)</i> - none		Bony fish <i>Recent synonym</i> - <i>Aphanopus acus</i> , <i>Aphanopus minor</i> , <i>Aphanopus schmidtii</i>
Image	Distribution	
 <p>Image: Ben James</p>	 <p>Black scabbardfish Distribution (presence in ICES or half ICES rectangles)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - Has a smooth, elongated body shape, somewhat similar to a sword scabbard, and a large mouth full of long, razor-sharp teeth. It can grow up to 1.1m in length and has a small forked tail. It is metallic black in colour with some iridescence.</p> <p>Habitat - Found on the continental slope and offshore banks and seamounts at depths between 200-1500m (generally deeper than 500m). They migrate closer to the surface at night to feed.</p> <p>Feeding - Feeds on crustaceans, squid and fish.</p> <p>Scottish distribution - Found in deep water off the west and north-west of Scotland.</p> <p>Wider distribution - Found in both the east and west Atlantic, the distribution follows the continental slope from Iceland to the Canaries in the east Atlantic, from Greenland to Newfoundland in the west Atlantic and along the mid-Atlantic Ridge as far south as the Azores. The only known spawning location in the north-east Atlantic is Madeira.</p> <p>Feature status - A commercial fish species caught by longliners off Madeira and as bycatch in deep water trawl fisheries west of Scotland. Fisheries data show that the stock west of Scotland declined steeply in the 1990s under intense fishing pressure. Since the introduction of fisheries management for deep water stocks in 2003, the stock appears to have stabilised at a low level.</p>		
Natural heritage importance		Information sources
Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase ICES Advice 2010 MarLIN MCS Fish online


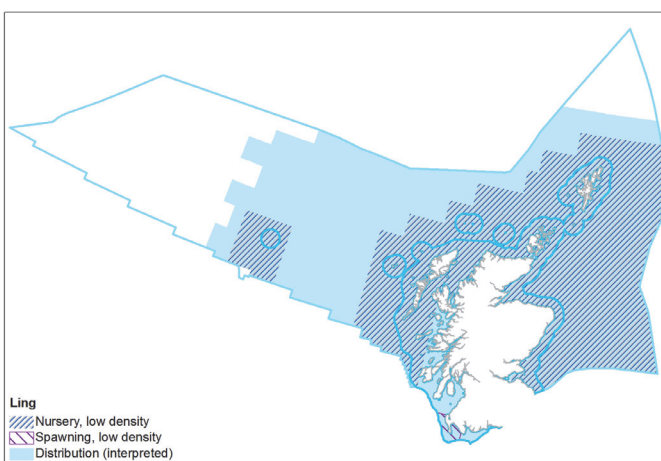
MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
BLUE LING - <i>MOLVA DYPTERYGIA</i>	Bony fish
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Francis Neat</p>	 <p>Blue ling</p> <ul style="list-style-type: none">Spawning, undetermined densityDistribution (presence in ICES rectangles and interpreted) <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>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.</p> <p>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 sea bed such as banks, mounds and seamounts, and peak at depths of between 730-1100m.</p> <p>Feeding - Feeds on crustaceans and fish.</p> <p>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.</p> <p>Wider distribution - North-east Atlantic from the Barents Sea and Iceland to Morocco and western Mediterranean. North-west Atlantic from Greenland to Newfoundland.</p> <p>Feature status - Blue ling form large spawning aggregations which make them particularly susceptible to overexploitation. ICES consider this stock to be severely 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.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES Advice 2010 MarLIN MCS FishOnline

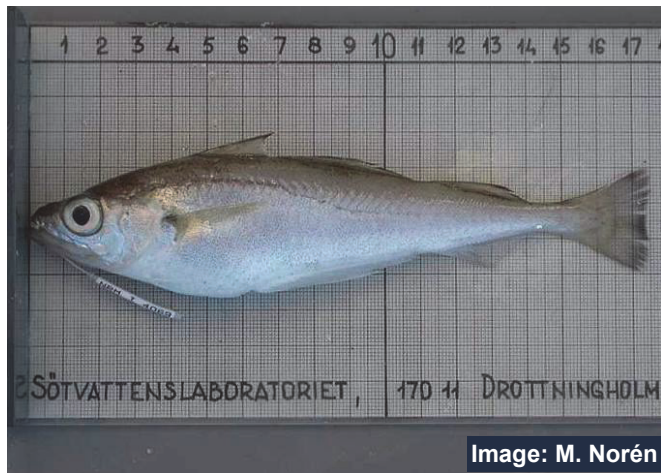
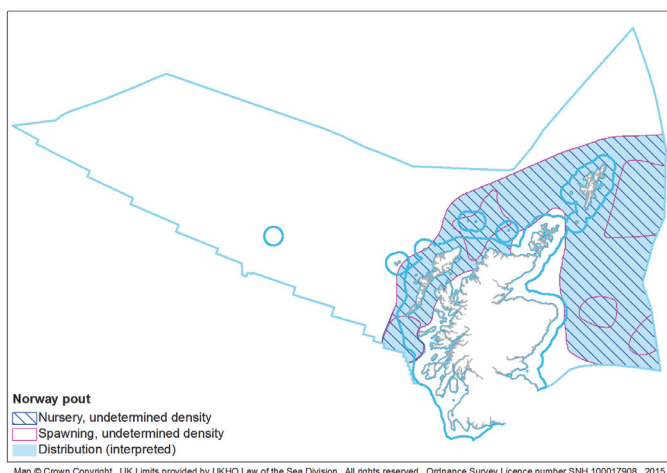
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
BLUE WHITING - <i>MICROMESISTIUS POUTASSOU</i>		Bony fish
<i>Other name(s)</i> - Couch's whiting, poutassou		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Francis Neat</p>	 <p>Blue whiting</p> <ul style="list-style-type: none">Nursery, high densityNursery, low densityDistribution (presence in ICES/ half ICES rectangles) <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>	
Feature description		
<p>Characteristics - A streamlined, thin bodied fish which normally grows to 25cm in length but can reach 50cm and weigh up to 830g. This fish has silver flanks and a blue-grey back. It has large eyes and a slightly forked tail.</p> <p>Habitat - Found on the continental shelf and slope and the open ocean to depths of more than 1000m, but most frequently at between 300-400m..</p> <p>Feeding - Feeds mainly on crustaceans, larger individuals may also eat small fish and cephalopods.</p> <p>Scottish distribution - Mainly along the continental shelf edge and deep waters west of Scotland and in the northern North Sea.</p> <p>Wider distribution - Found across the North Atlantic from northern Africa as far north as Russian Arctic waters, and as far west as the eastern coast of the USA.</p> <p>Feature status - This species has suffered from poor recruitment to the population since 2005, leading to a rapid decline in the stock and an historical low in 2011. Large catch reduction has allowed the stock to recover and since 2015 ICES have reintroduced a small catch limit .</p>		
Natural heritage importance		Information sources
Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase ICES Advice 2009 MarLIN


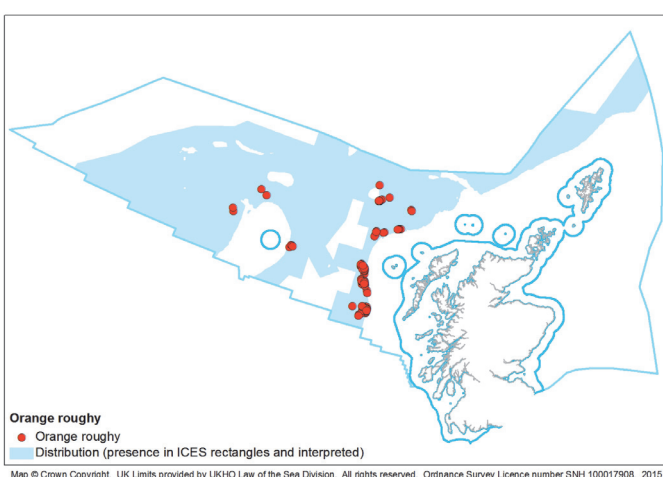
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
COD - <i>GADUS MORHUA</i>	Bony fish
<i>Other name(s)</i> – Atlantic cod, skrei, bodach	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Paul Kay</p>	
Feature description	
<p>Characteristics – A large fish which may grow up to 2m in length and weigh over 90kg, although more typically recorded at around 120cm in length and up to 12kg in weight. Coloration is variable dependent upon habitat, with the majority having a mottled brown appearance with white undersides and spots. Generally, fins are round edged, though the tail fin may be square. Cod have a barbel attached to their chins.</p> <p>Habitat - Cod can be found from the shoreline down to depths of 600m. Juvenile cod tend to settle and overwinter in shallow coastal areas, but eventually disperse into deeper water.</p> <p>Feeding - Feed predominantly at dawn or dusk on a variety of invertebrates and marine fish, including young cod, sandeels, Norway pout, herring and whiting.</p> <p>Scottish distribution - Found all around the Scottish coastline and in offshore areas. There are important spawning grounds to the west and east of Shetland, extending offshore from around Lewis and Harris in the Outer Hebrides, between Islay and Mull and within the Clyde. Coastal nursery areas in the Firths of Clyde, near the Tay, Forth and Moray, supply nearby spawning areas whilst nursery areas around Shetland contribute to both local spawning groups and larger offshore spawning areas in the North Sea.</p> <p>Wider distribution - Found throughout UK and Irish waters and through temperate seas from the North American coastline around the Arctic and throughout northern Europe, south to the Bay of Biscay.</p> <p>Feature status - Primarily as a result of overfishing, stocks have severely declined in many areas including parts of the north-east Atlantic. ICES advise that the cod stocks of the North Sea, western Scotland and Irish Sea are outside safe biological limits. European stocks are currently managed under a cod recovery plan which is expected to result in stock recovery, although increases in sea temperature may make recovery slower than expected. Cod from Scottish coastal areas have not recovered since the 1980s.</p>	
Natural heritage importance	Information sources
IUCN Red List (Vulnerable) OSPAR T&D Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES FishMap MarineBio Marine Scotland Fish & Shellfish Stocks 2010 OSPAR Case Reports

MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
GREENLAND HALIBUT - <i>REINHARDTIUS HIPPOGLOSSOIDES</i>	Bony fish
<i>Other name(s)</i> - black halibut, blue halibut, lesser halibut	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Francis Neat</p>	 <p>Greenland halibut Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Greenland halibut are a large flatfish. Females can grow to a maximum length of 120cm and a weight of 45kg but individuals are commonly around 56cm long and weigh between 11-25kg. Males are usually smaller than females. They range in colour from yellowish to greyish-brown. The underside is visibly paler than the upperside.</p> <p>Habitat - A deep water species found at depths from 200-2000m.</p> <p>Feeding - Feeds on crustaceans, other marine fish, deep-sea prawns and bottom-dwelling invertebrates. It has been observed feeding high in the water column where it is believed to swim upright like a normal fish.</p> <p>Scottish distribution - Primarily occurs in cold, deep water north-west of Shetland.</p> <p>Wider distribution - Found across the North Atlantic and Arctic Oceans. Northern Scotland is at the southern limit of its distribution. Also found in the North Pacific.</p> <p>Feature status - Greenland halibut are a minor commercial fish species in Scottish waters. As a long-lived and slow growing species they are susceptible to overfishing. The current stocks are at a historical low level in some areas of its distribution.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES Advice 2010 MarLIN MCS Fish online


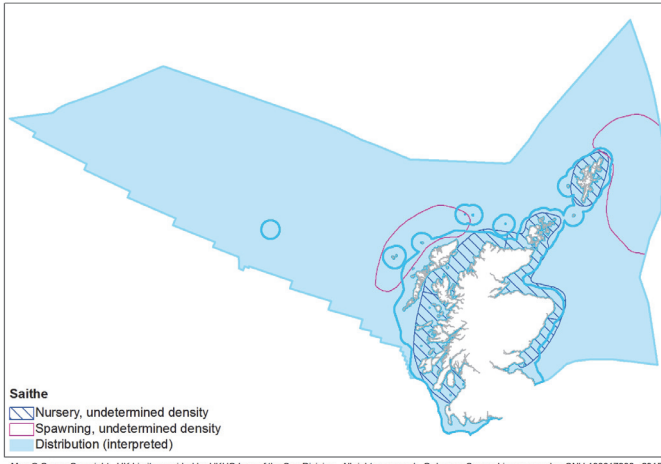
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
HORSE MACKEREL - <i>TRACHURUS TRACHURUS</i>		Bony fish
<i>Other name(s)</i> - Atlantic horse mackerel, scad		<i>Recent synonym</i> - <i>Trachurus capensis</i>
Image	Distribution	
 <p>Image: Paul Newland</p>	 <p>Horse mackerel Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - A schooling species of fish which usually grows to 45cm in length, but some records suggest they can reach a maximum length of 60cm. Tend to be silver in colour, though the bottom-side is often darker, with a series of prominent bony scales along its lateral line. This species has a large head with large eyes and a distinguishable black spot on the trailing edge of the gill cover.</p> <p>Habitat - A pelagic species which typically occurs on the continental shelf down to 200m in depth, but has been reported at depths of >1000m.</p> <p>Feeding - Feed primarily on plankton, with larger individuals also consuming young fish and squid.</p> <p>Scottish distribution - A migratory species, the western stock breeds off the southern coast of Ireland before making a summer feeding migration up the west of Scotland and round the north coast into the northern North Sea. In autumn they return south to over-winter in deep water off the south coast of Ireland.</p> <p>Wider distribution - Abundant and widespread across the north-east Atlantic and Mediterranean, ranging from Iceland to the Cape Verde Islands.</p> <p>Feature status - Numbers fluctuate depending on occasional years in which extremely large numbers of young fish are produced. After these big recruitment events, the population declines.</p>		
Natural heritage importance		Information sources
IUCN Red List (Vulnerable) UK BAP		FAO Species Fact Sheet ICES FishMap MarLIN UK BAP Species Definitions


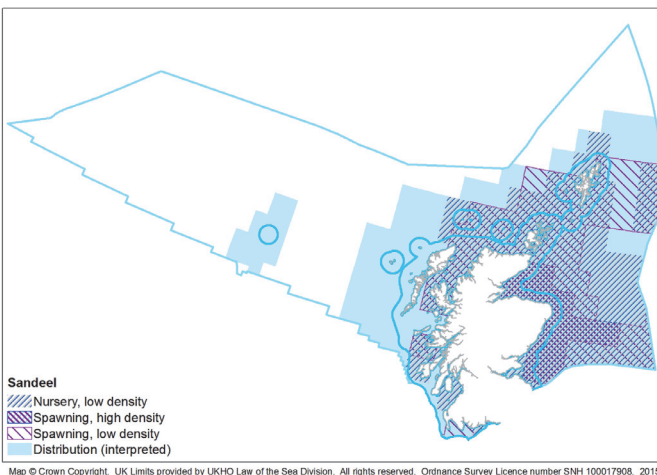
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
LING - <i>MOLVA MOLVA</i>	Bony fish
<i>Other name(s)</i> - European ling	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Paul Naylor</p>	 <p>Ling</p> <ul style="list-style-type: none">Nursery, low densitySpawning, low densityDistribution (interpreted) <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Usually growing to about 120cm in length but occasionally up to 2m and 30kg in weight. They have a greenish-brown and bronze pattern on top, with paler sides and underside. Their fins have distinct white edges and black spots. They have two fins on their backs, the first short and the second long, spanning more than half the length of the fish, stopping just before the tail. The fin on the underside is slightly shorter, stretching along the back half of the fish.</p> <p>Habitat - Adults are found most commonly in waters between 100-400m in depth associated with rocky reef habitat, but may also be encountered in cracks and crevices at depths below 10m. Juveniles are found in shallower coastal areas.</p> <p>Feeding - Feed mostly on other marine fish such as herring and flatfish but also eat crustaceans and starfish.</p> <p>Scottish distribution - Widely distributed around all coasts and offshore waters.</p> <p>Wider distribution - Found off southern Greenland and Canada in the north-west Atlantic and ranges from the Barents Sea and Iceland to Morocco in the north-east Atlantic. Also recorded in the north-western Mediterranean Sea.</p> <p>Feature status - Scotland is considered to have a large proportion of the British population (due to availability of suitable habitat). Stock levels have been stable since the late 1990s but historical levels may have been higher.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase MarLIN MCS Fish online


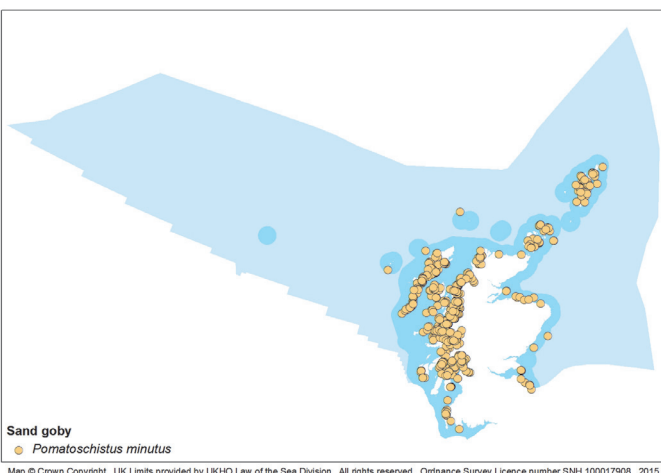
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
NORWAY POUT - <i>TRISOPTERUS ESMARKII</i>	Bony fish
<i>Other name(s)</i> - none	<i>Recent synonym</i> - <i>Gadus esmarkii</i>
Image	Distribution
	
Feature description	
<p>Characteristics - A small relative of the cod which grows to about 19cm in length, with the largest known record 35cm in length. They are green-brown in colour with silver sides and a white underside. A small but distinct spot can be found near the pectoral fin. It has a moderately long, thin barbel found on the chin and a prominent lower jaw. There are three fins on its back and two fins on its underside.</p> <p>Habitat - Found in open water areas over sandy and muddy substrates, generally at depths of 80-200m.</p> <p>Feeding – A benthic predator, usually found within a few metres of the sea bed where it preys upon small crustaceans, amphipods, shrimps and some small marine fish, eggs and larvae.</p> <p>Scottish distribution - Norway pout are found off all coasts of Scotland, with high numbers in the Minch. Its main spawning grounds are to the east of Shetland, the northern North Sea, off the Inner Hebrides and north of the Minch.</p> <p>Wider distribution - Widely distributed in the north-east Atlantic, ranging from the Barents Sea, Iceland and the Faroe Islands in the north to the English Channel.</p> <p>Feature status - Norway pout is a commercially important fish species, harvested mainly for fish meal and oil. It is an important component in the diet of larger, commercially important food fish species e.g. cod, hake, whiting and pollock. Recruitment is variable and fluctuations in the North Sea stock largely result from varying recruitment although overfishing has been implicated in some years.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List	FAO Species Fact Sheet Fishbase ICES FishMap MarLIN MCS Fish Online

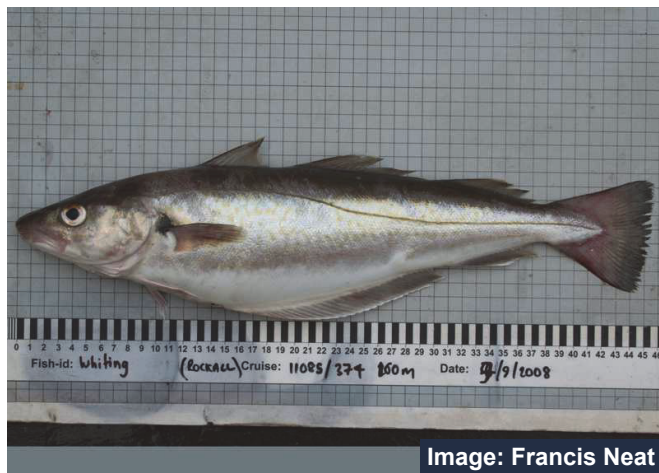
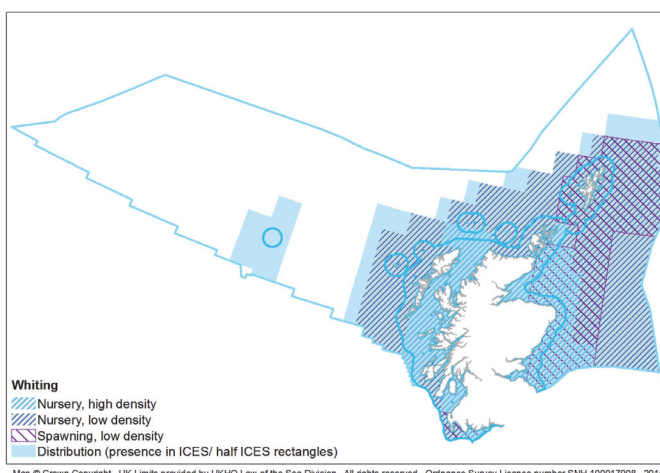
MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
ORANGE ROUGHY - <i>HOPLOSTETHUS ATLANTICUS</i>	Bony fish
<i>Other name(s)</i> - deep sea perch, red roughy, rosy soldier fish	<i>Recent synonym</i> - none
Image	Distribution
	
Feature description	
<p>Characteristics - This deep water fish species can reach up to 75cm in length and weigh up to 7kg. When caught, orange roughy are a 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.</p> <p>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 sea bed.</p> <p>Feeding - Feeds on crustaceans, squid and fish.</p> <p>Scottish distribution - In deep water to the north and west of Scotland.</p> <p>Wider distribution - A global but patchy deep water distribution.</p> <p>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. ICES recommends no directed fisheries for this species and bycatch should be minimised.</p>	
Natural heritage importance	Information sources
OSPAR T&D Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES Advice 2010 Mar-Eco MarLIN MCS FishOnline


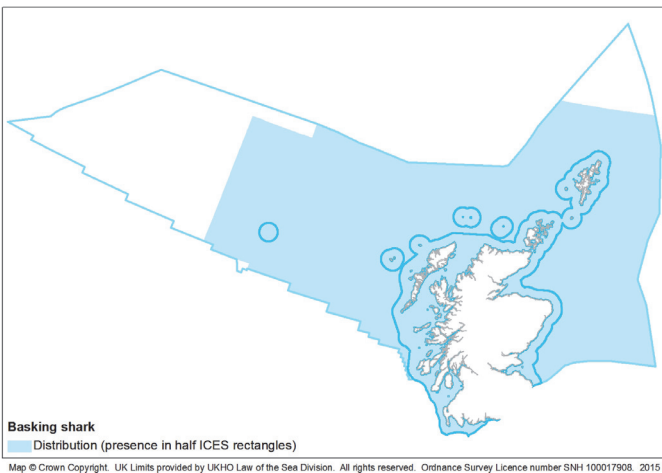
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
ROUND-NOSE GRENADE - <i>CORYPHAENOIDES RUPESTRIS</i>		Bony fish
<i>Other name(s)</i> - rock grenadier, blunt-nosed rattail		<i>Recent synonym</i> - none
Image	Distribution	
		
Feature description		
<p>Characteristics - A member of the rat-tail family, and as the name would suggest has a long, tapering tail. They are brown to grey in colour and can reach up to 1.1m in length. A very small barbel is present on the chin.</p> <p>Habitat - Usually inhabits the continental shelf at depths of 180-2000m, but most abundant between about 1000 and 1500m.</p> <p>Feeding - Feed on a variety of fish and invertebrates.</p> <p>Scottish distribution - Deep water to the west of Scotland, but also found to the north and east of Scotland.</p> <p>Wider distribution - In the north-east Atlantic from North Africa to Norway and southern Iceland. Also found on the Mid-Atlantic Ridge and the north-west Atlantic from south-western Greenland to New England.</p> <p>Feature status - This species is slow to reproduce and hence susceptible to overfishing. Intense fishing pressure in the 1990s caused a rapid decline in the stock to the west of Scotland. Since management was introduced in 2003, the stock has stabilised at a low level. ICES recommend that the fishery does not expand above current levels.</p>		
Natural heritage importance		Information sources
IUCN Critically endangered Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase ICES Advice 2010 MarLIN


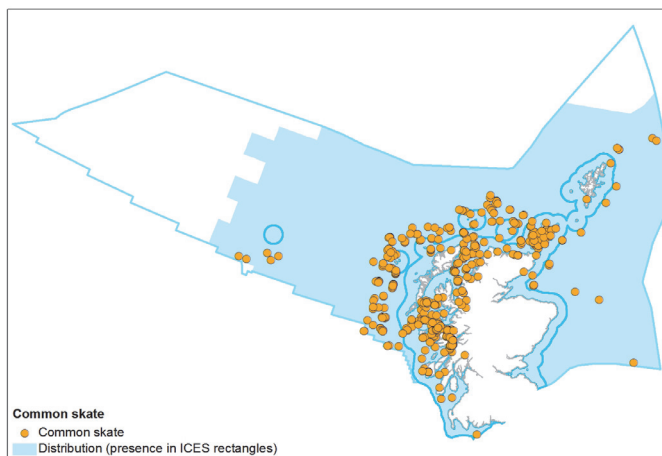
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
SAITHE - <i>POLLACHIUS VIRENS</i>	Bony fish
<i>Other name(s)</i> - coalfish, coaly, coley, billet, green cod, glassan, glosshan, sillock	<i>Recent synonym</i> - none
Image	Distribution
 <div>Image: Sue Scott</div>	 <div>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</div>
Feature description	
<p>Characteristics - Saithe usually grow to about 60cm in length but have been recorded at 130cm and 30kg in weight. A member of the cod family, it has three fins on top, and is often a greenish-brown in colour on the back with lighter sides and silver on the belly.</p> <p>Habitat - Juvenile saithe are found in nearshore waters in habitats ranging from aquatic vegetation to open areas of cobbles, bedrock and sandy mud substrates. Adults remain offshore and have a cosmopolitan distribution across Scotland's seas. Important spawning grounds are known from the west and north-east of Scotland.</p> <p>Feeding - The adult diet consists mostly of fish, with juveniles feeding on crustaceans and small fish.</p> <p>Scottish distribution - Found all around the coast and in offshore waters with spawning grounds around St Kilda, and to the west of the Outer Hebrides and east of Shetland. Nursery areas are present in most Scottish coastal waters out to three nautical miles.</p> <p>Wider distribution - Found around the UK and Irish coast and offshore waters. Extends from the Bay of Biscay to Greenland and in the west Atlantic from Greenland south to North Carolina.</p> <p>Feature status - This species is a highly valuable and commercially important fish. The main fishery is offshore, so juveniles are less affected. The current stock level is considered to be within safe biological limits and harvested sustainably, however, spawning stock has declined making this species on the limits of being sustainably exploited.</p>	
Natural heritage importance	Information sources
	FAO Species Fact Sheet Fishbase ICES FishMap Marine Scotland Fish & Shellfish Stocks 2010 MarLIN



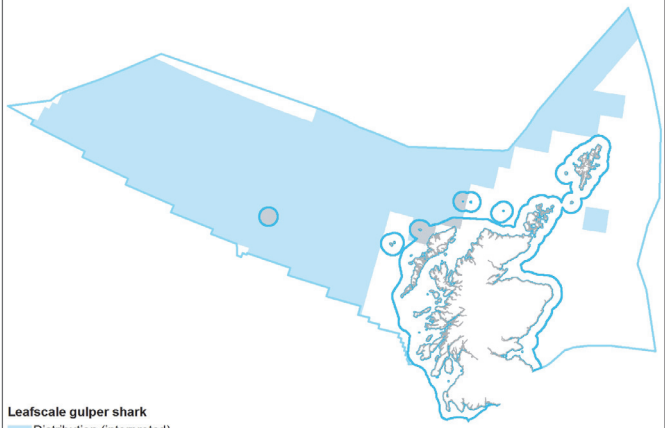
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
SANDEELS - <i>AMMODYTES MARINUS</i> AND <i>AMMODYTES TOBIANUS</i>	Bony fish
<i>Other name(s)</i> - Raitt's sandeel, lesser sandeel, small sandeel	<i>Recent synonym</i> - none
Image	Distribution
	 <p>Sandeel Nursery, low density Spawning, high density Spawning, low density Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>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 (<i>Ammodytes tobianus</i>) grow to about 20cm in length while Raitt's sandeel (<i>A. marinus</i>) may reach up to 25cm in length.</p> <p>Habitat - Sandeels are burrowing fish, found in areas with sandy, low silt sediments. They tend to remain buried between September and February, other than for spawning. Sandeels have demersal eggs which hatch after several weeks. The larvae drift in the plankton for up to a few months before settling in sandy habitat in May and June. During spring and summer they form large schools in the water column.</p> <p>Feeding - Feed on zooplankton (primarily copepods and other crustaceans).</p> <p>Scottish distribution - All Scottish coasts and offshore, particularly in the North Sea (only <i>A. marinus</i> occurs in offshore waters).</p> <p>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.</p> <p>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 historical 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. Fishing pressure on sandeels in the west-central North Sea is unknown but it is probably very low. An area off the east coast of Scotland is closed to fishing and there are licensing restrictions on the west coast.</p>	
Natural heritage importance	Information sources
Scottish Biodiversity List UK BAP (<i>A. marinus</i> only)	FishBase Marine Scotland Science MarLIN RSPB


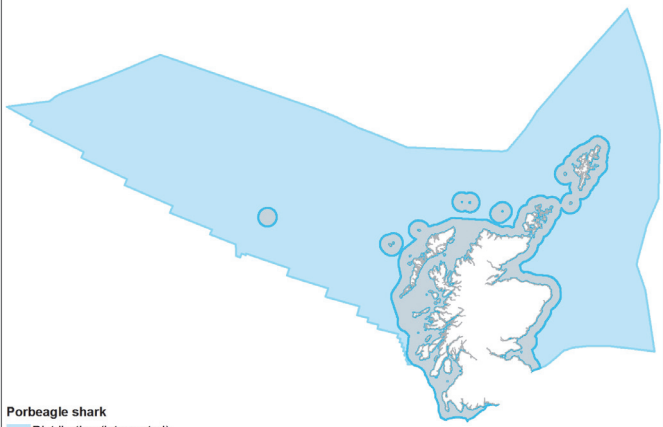
MOBILE SPECIES	TERRITORIAL WATERS
Common name - <i>Scientific name</i>	Species group
SAND GOBY - <i>POMATOSCHISTUS MINUTUS</i>	Bony fish
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none
Image	Distribution
	
Feature description	
<p>Characteristics - A small goby that reaches a maximum length of 10cm. They have a slender body and a large head which accounts for about a quarter of the total length. They are pale brown or grey in colour with darker markings on the sides. Their undersides are creamy-white in colour. Males often have a prominent dark blue spot on the rear of the first dorsal fin. They are very difficult to distinguish from other closely related species such as the common goby.</p> <p>Habitat - Found on coarse sandy to muddy sediments in estuaries, lagoons, sea lochs and saltmarshes.</p> <p>Feeding - Feeds on small worms and crustaceans including sand hoppers and mysid shrimp.</p> <p>Scottish distribution - Widespread around the Scottish coastline, with most records along the west coast, the Hebrides, Orkney and Shetland.</p> <p>Wider distribution - Widespread around the coasts of the British Isles. The sand goby is found from Norway to Spain, as well as in some locations in the Mediterranean and Black Sea.</p> <p>Feature status - The British Isles support a substantial proportion of the European and global population of this species and Scottish populations are considered globally important.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern)	Encyclopedia of Marine Life Fishbase MarLIN


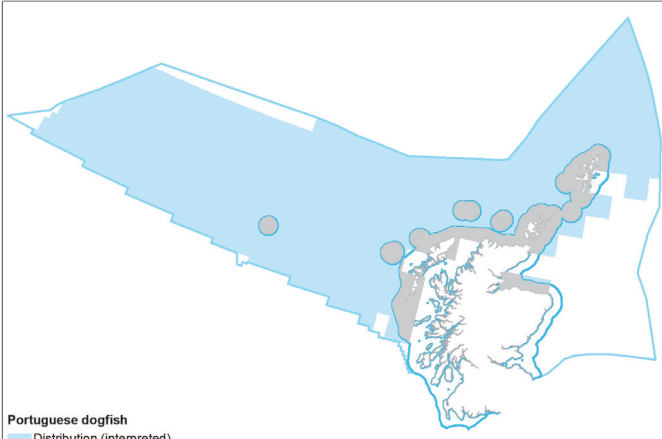
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
WHITING - <i>MERLANGIUS MERLANGUS</i>	Bony fish
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Francis Neat</p>	 <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>Characteristics - A cod-like fish with a pointed head which usually grows up to 40cm in length but can grow to 70cm and weigh up to 3kg. Variable coloration ranging through yellowish-brown, dark blue or green on the sides, with a yellowish-grey, white and silvery coloration on the belly. It has a small dark spot at the base of its pectoral fins and the lateral line is brown in colour.</p> <p>Habitat - Found in shallow water, rarely deeper than 200 metres. Usually around sandy or muddy ground. Juveniles in particular are found in nearshore waters and are very common within Scottish sea lochs and firths.</p> <p>Feeding - Feeds on a variety of fish and crustaceans, with the proportion of fish in the diet increasing with age. An important predator on the European continental shelf.</p> <p>Scottish distribution - Found around all coasts and offshore waters of Scotland, with important spawning areas along the east coast, to the west of Shetland and in the northern North Sea. Important nursery areas in nearshore waters. The North Sea stock probably comprise a northern and southern population, with the northern residing in north English and Scottish waters.</p> <p>Wider distribution - This species is found around the UK and Irish coastlines and offshore waters. Also found from the south-eastern Barents Sea and Iceland to Portugal.</p> <p>Feature status - A commercially targeted fish, assessments indicate that the North Sea stock has been low but stable since 2003. West of Scotland populations have been declining since 2000 and are at the lowest levels ever recorded. ICES advises that, for West of Scotland, there should be no directed fisheries and all catches should be minimised.</p>	
Natural heritage importance	Information sources
IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES FishMap Marine Scotland Fish & Shellfish Stocks 2010 MarLIN

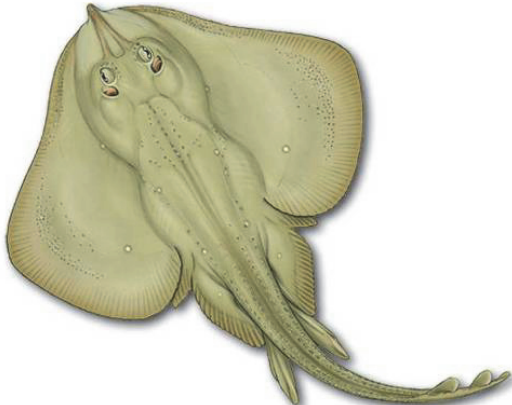
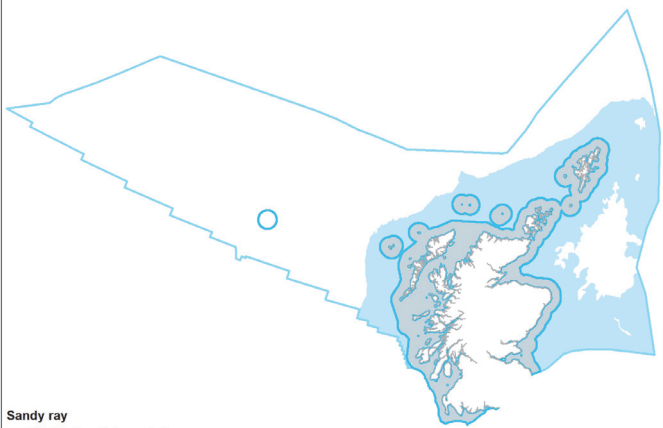
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
BASKING SHARK - <i>CETORHINUS MAXIMUS</i>	Sharks, skates and rays
<i>Other name(s)</i> - elephant shark	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Alex Mustard / 2020Vision</p>	 <p>Basking shark Distribution (presence in half ICES rectangles)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - The largest fish to visit British waters and the second largest fish in the world growing up to 12m in length. Basking sharks have a crescent-moon shaped tail and five long gill slits that run from the back behind the head round to 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.</p> <p>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.</p> <p>Feeding - Feeds on plankton by filtering water, which passes in through the mouth and out through the comb-like rakers on the gills.</p> <p>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 as a breeding ground.</p> <p>Wider distribution - Recorded globally throughout temperate waters and is migratory, probably following food.</p> <p>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 potential threats to populations in British waters. They are listed as ‘Endangered’ in the north-east Atlantic and their status is considered to be ‘Vulnerable’ globally.</p>	
Natural heritage importance	Information sources
CITES Appendix II IUCN Red list (Vulnerable) OSPAR T&D Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	SNH habitat modelling analysis for basking shark ARKive FishBase MarLIN Shark Trust SNH Commissioned Research Report No. 339


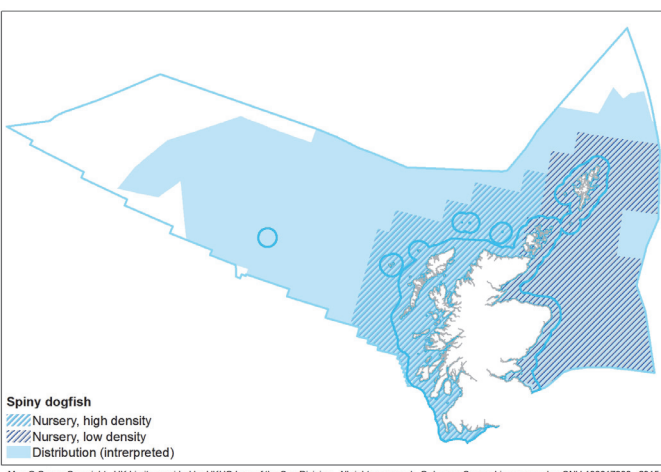
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
COMMON SKATE - <i>DIPTURUS BATIS</i> COMPLEX	Sharks, skates and rays
<i>Other name(s)</i> - blue skate, flapper skate	<i>Recent synonym</i> - <i>Raja batis</i>
Image	Distribution
 <div>Image: SNH / MSS</div>	 <div>Common skate ● Common skate ● Distribution (presence in ICES rectangles)</div> <div>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</div>
Feature description	
<p>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.</p> <p>Habitat - Lives on sandy, muddy and gravel bottoms from the coast down to 600m.</p> <p>Feeding - An opportunistic feeder and scavenger, this species feeds on worms, sandeels, crabs, molluscs and flatfish on the sea bed. It is also known to actively hunt fish and smaller elasmobranchs within the water column.</p> <p>Scottish distribution - Once found throughout Scottish waters, it has now disappeared from the North Sea (except in the far north) and the Irish Sea.</p> <p>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.</p> <p>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 area around Isle of Mull, Sound of Jura and the Firth of Lorn retains a seemingly healthy population.</p>	
Natural heritage importance	Information sources
IUCN Red List (Critically endangered) OSPAR T&D Scottish Biodiversity List UK BAP	Fishbase MarLIN OSPAR Case Report Shark Trust


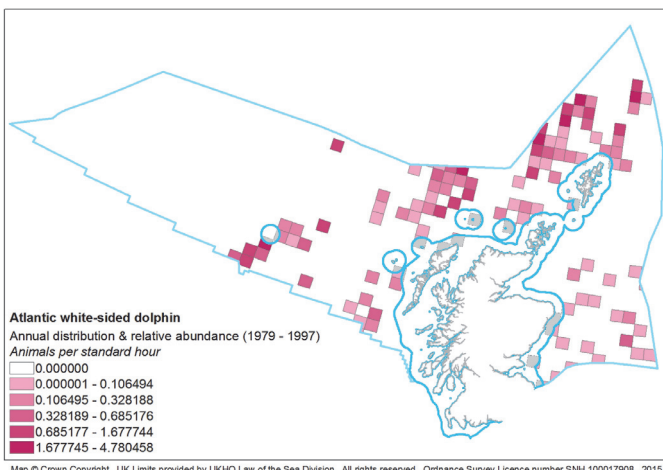
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
LEAFSCALE GULPER SHARK - <i>CENTROPHORUS SQUAMOSUS</i>		Sharks, skates and rays
<i>Other name(s)</i> - false siki		<i>Recent synonym</i> - none
Image(s)	Distribution	
 Image: The Shark Trust / Marc Dando  Image: Francis Neat	 Leafscale gulper shark Distribution (interpreted) <small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small>	
Feature description		
Characteristics - A moderately sized shark that can reach lengths of up to 160cm but rarely exceeds more than 120cm in length. It has a uniform grey to brown body colour, with a relatively long, broad snout and large, reflective green eyes. It has two fins on its back, each with a prominent spine on the leading edge. It has rough leaf like projections on the skin, known as denticles. The tail has a larger upper than lower lobe, and is wedge shaped.		
Habitat - Found on continental slopes, rarely above depths of 500m, but they do range between 230-3300m.		
Feeding - Thought to feed on fish, squid and octopus.		
Scottish distribution - Deep water to the west of Scotland including Rockall and other offshore banks and seamounts.		
Wider distribution - Widespread along the continental slopes of the east Atlantic and the west Pacific.		
Feature status - The leafscale gulper shark is a commercially valuable food fish. The oil from its liver is of high value as a source of squalene. However, it is slow growing and reaches sexual maturity late on in life and, therefore, is susceptible to overfishing. Its population is currently depleted and it is regarded as 'Vulnerable' internationally and 'Endangered' in the north-east Atlantic. The EU has prohibited directed fishing for all deep water sharks since 2007 and has now reduced the quota for bycatch to zero. However, incidental bycatch (which must be discarded) remains a potential threat.		
Natural heritage importance		Information sources
IUCN Red List (Vulnerable) OSPAR T&D Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase MarLIN MCS Fish online OSPAR Case Report Shark Trust


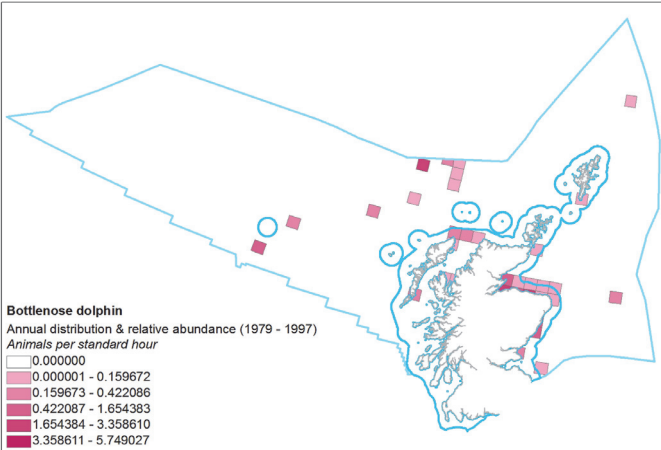
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
PORBEAGLE SHARK - <i>LAMNA NASUS</i>		Sharks, skates and rays
<i>Other name(s)</i> - bottle-nosed shark, Beaumaris shark		<i>Recent synonym</i> - <i>Squalus cornubicus</i>
Image	Distribution	
 <p>Image: The Shark Trust / Marc Dando</p>	 <p>Porbeagle shark Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
	<p>Feature description</p> <p>Characteristics - A dark blue or bluish grey, white bellied, stout shark with large black eyes and a conical snout. Can reach up to 3.5m in length. They have five very obvious gill slits on each side of their head. The first of the two fins on its back is large and triangular with a white patch on the rear base. The second fin on the back is considerably smaller.</p> <p>Habitat - Usually found in mid-water between 200-700m but they do sometimes range into shallower coastal waters.</p> <p>Feeding - Feeds on a number of marine fish including smaller sharks and squid.</p> <p>Scottish distribution - Widely distributed around Scotland.</p> <p>Wider distribution - In the northern hemisphere it is found only in the Atlantic Ocean, from the north-east coast of North America, Canada and Greenland to the western Barents Sea and southwards to the north-west coast of Africa and the Mediterranean. Populations in the north-east and north-west Atlantic appear to be separate and are also distinct from those in the southern hemisphere.</p> <p>Feature status - Currently listed as 'Critically Endangered' in the north-east Atlantic, and 'Vulnerable' internationally by the IUCN. It is fished for meat and fins which has led to over-exploitation. It is a long lived species, with long gestation periods and low numbers of young per individual and, hence, is highly susceptible to overfishing.</p>	
Natural heritage importance		Information sources
IUCN Red List (Vulnerable) CITES Appendix II & III OSPAR T&D Scottish Biodiversity List UK BAP		FAO Species Fact Sheet Fishbase MarLIN OSPAR Case Report Shark Trust The Scottish Sea Angling Conservation Network


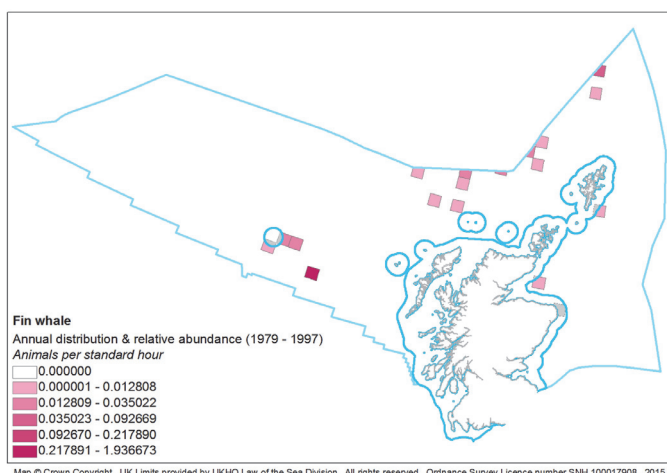
MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
PORTUGUESE DOGFISH - <i>CENTROSCYMNUS COELOLEPIS</i>	Sharks, skates and rays
<i>Other name(s)</i> - Portuguese shark, siki shark	<i>Recent synonym</i> - <i>Centrophorus coelolepis</i> , <i>Scymnodon melas</i>
Image(s)	Distribution
 <p>Image: The Shark Trust / Marc Dando</p> <p>Image: Francis Neat</p>	 <p>Portuguese dogfish Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Has a short snout and a stocky body which tapers gently towards the tail. Uniformly dark chocolate to golden brown in colour across its whole body, and can reach 120cm in length. There are two small fins on its back, with a small spine protruding at the front of each fin. The five gill slits are short and low down on the head.</p> <p>Habitat - A deep water species found between 400-3600m on the continental slope and the abyssal plains.</p> <p>Feeding - Feeds on fish, squid, octopus and marine snails, with cetacean carcass meat consumed occasionally.</p> <p>Scottish distribution - Deep water to the west of Scotland including Rockall and other offshore banks and seamounts.</p> <p>Wider distribution - Ranges from the Grand Banks, USA to Cuba in the west Atlantic, and from Iceland to the south-western cape coast of South Africa in the east Atlantic. Also found in the western Mediterranean and some areas of the western Pacific including waters off Japan, New Zealand and Australia.</p> <p>Feature status - Portuguese dogfish are a commercially valuable food fish used for their meat and liver oil. As a long-lived, slow growing species, they are susceptible to overfishing and regarded as 'Near Threatened' internationally and 'Endangered' in the north-east Atlantic. The EU has prohibited directed fishing for all deep water sharks since 2007 and has now reduced the quota for bycatch to zero. However, incidental bycatch (which must be discarded) remains a potential threat.</p>	
Natural heritage importance	Information sources
IUCN Red List (Near threatened) OSPAR T&D Scottish Biodiversity List UK BAP	Fishbase Marine Species Identification Portal MCS Fish Online OSPAR Case Report Shark Trust


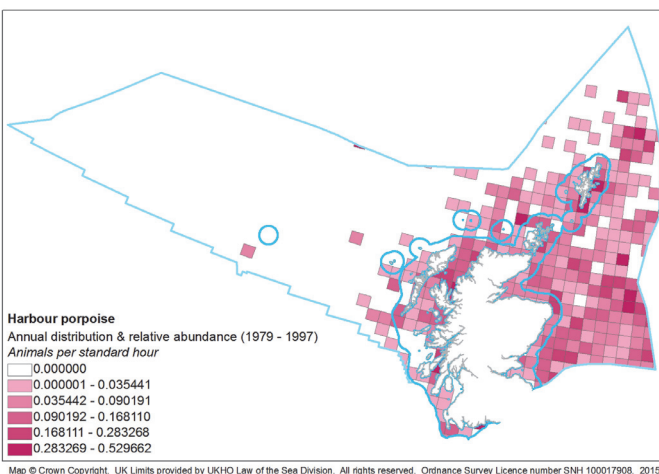
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
SANDY RAY - <i>LEUCORAJA CIRCULARIS</i>		Sharks, skates and rays
<i>Other name(s)</i> - sandy skate, leather ray, Faroese roker		<i>Recent synonym</i> <i>RAJACIRCULARIS</i>
Image	Distribution	
 <p>Image: The Shark Trust / Marc Dando</p>	 <p>Sandy ray Distribution (interpreted)</p> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
	<p>Feature description</p> <p>Characteristics - The sandy ray is a medium sized skate that can reach 70-120cm in length. It has a short snout with a very pronounced tip and a short tail which is only slightly longer than its body. Its upper surface tends to be light brown (sandy) to red brown in colour with 4-6 cream coloured spots on each of its pectoral fins. The underside is white.</p> <p>Habitat - Occurs at depths ranging from 70-275m (most commonly around 100m), although it has been suggested that the species favours slightly deeper water in Scotland (approx 180m). The sandy ray is an offshore species and tends to be found on sandy sediments on the sea floor.</p> <p>Feeding - Crustaceans and small fish.</p> <p>Scottish distribution - North-west and east offshore waters.</p> <p>Wider distribution - Across the east Atlantic from northern Morocco to southern Norway and out to Iceland.</p> <p>Feature status - The status of this species is unknown. While there is no targeted fishery for sandy ray, incidental bycatch may have led to a decline in numbers. The species was designated as a conservation priority under the UK Biodiversity Action Plan (BAP) in 2007.</p>	
Natural heritage importance		Information sources
IUCN red list (Endangered) Scottish Biodiversity List UK BAP		MarLIN Shark Trust UK BAP Species Definitions


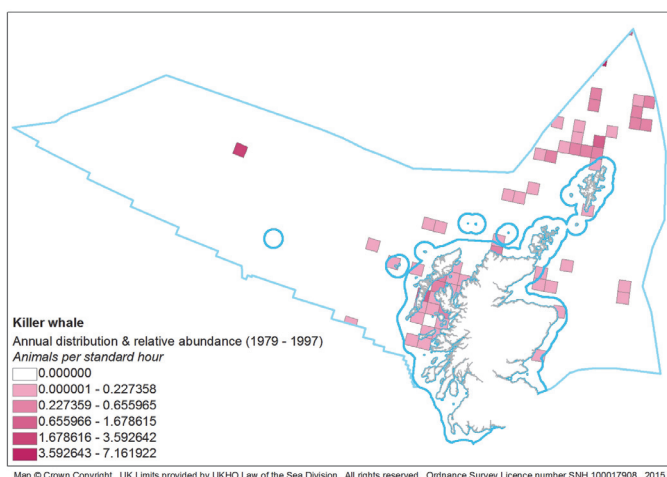
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
SPINY DOGFISH - <i>SQUALUS ACANTHIAS</i>	Sharks, skates and rays
<i>Other name(s)</i> - spurdog, piked dogfish, rock, rock salmon, white spotted dogfish	<i>Recent synonym</i> - none
Image	Distribution
	 <p>Spiny dogfish</p> <ul style="list-style-type: none">Nursery, high densityNursery, low densityDistribution (interpreted) <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - A small dogfish reaching lengths of 1.2m. Grey-brown in colour on its upper-body, with paler undersides and white spots over its back. It has two fins on its back, each with a large spine, as well as a smooth tail fin. The upper half of the tail fin is much larger than the lower section. The spiny dogfish is one of the most abundant shark species in the world, although there is a documented decline in some parts of the north-east Atlantic - in some areas reaching up to ~95% of the population.</p> <p>Habitat - Found mostly at depths of between 10-200m, but can reach depths of up to 900m. Can form schools of different sex and size.</p> <p>Feeding - Feeds on a variety of bony fish and crustaceans.</p> <p>Scottish distribution - Widely distributed throughout Scottish waters.</p> <p>Wider distribution - Worldwide in temperate seas.</p> <p>Feature status - This species is regarded as 'Vulnerable' globally and 'Endangered' in the north-east Atlantic, where populations are currently depleted to a fraction (<20%) of their former levels. Often marketed as rock salmon in fish and chip shops. The EU has banned direct fishing but bycatch continues to pose a threat to this long-lived, slow to mature species.</p>	
Natural heritage importance	Information sources
IUCN Red List (Vulnerable) OSPAR T&D Scottish Biodiversity List UK BAP	FAO Species Fact Sheet Fishbase ICES FishMap MarLIN OSPAR Case Report Shark Trust


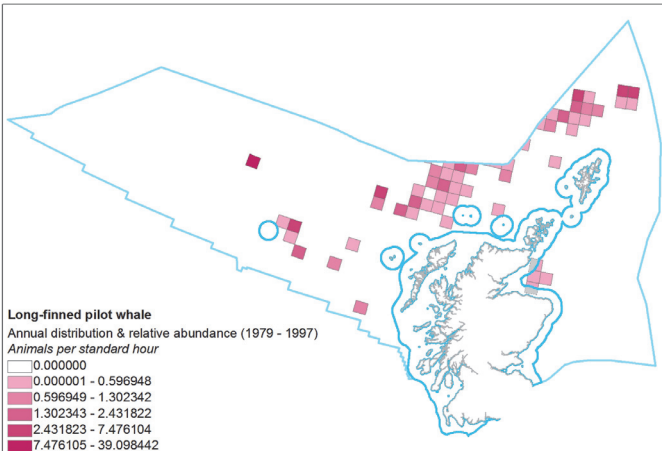
MOBILE SPECIES		OFFSHORE WATERS						
Common name - <i>Scientific name</i>		Species group						
ATLANTIC WHITE-SIDED DOLPHIN - <i>LAGENORHYNCHUS ACUTUS</i>		Whales, dolphins and porpoises						
Other name(s) - none		Recent synonym - none						
Image	Distribution							
 <p>Image: Oliver Ó Cadhla</p>	 <p>Atlantic white-sided dolphin Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <table><tr><td>0.000000</td></tr><tr><td>0.000001 - 0.106494</td></tr><tr><td>0.106495 - 0.328188</td></tr><tr><td>0.328189 - 0.685176</td></tr><tr><td>0.685177 - 1.677744</td></tr><tr><td>1.677745 - 4.780458</td></tr></table> <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>		0.000000	0.000001 - 0.106494	0.106495 - 0.328188	0.328189 - 0.685176	0.685177 - 1.677744	1.677745 - 4.780458
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1.677745 - 4.780458								
Feature description								
<p>Characteristics - This dolphin has a gently sloping head with a short stout beak and a straight mouthline. They have a dark grey-black back and a brilliant white underside. They are commonly 2.5-2.8m in length, can live up to 22 years (males) and 27 years (females) and typically reach breeding age between 6 and 12 years. Often perform acrobatic leaps and are known to ride the bow waves of boats. They normally occur in small pods of 6-8 individuals and are extremely fast swimmers, travelling long distances at a rate of up to 14km/h.</p> <p>Habitat - This dolphin is very nomadic, found offshore in deep oceanic waters, preferring the outer continental shelf and slope in water depths between 100-500m. However, they have also been seen in shallower waters.</p> <p>Feeding - Feeds on a variety of marine fish, squid and crustaceans.</p> <p>Scottish distribution - Concentrated around the Hebrides, Northern Isles and the North Sea.</p> <p>Wider distribution - Found in offshore temperate and subarctic waters of the North Atlantic but particularly common in areas of the North Sea and the eastern North Atlantic, which have been suggested to be important breeding grounds.</p> <p>Feature status - Atlantic white-sided dolphins are particularly sensitive to noise disturbance (e.g. from shipping, oil and gas operations and offshore developments), dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch.</p>								
Natural heritage importance		Information sources						
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V		JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide						


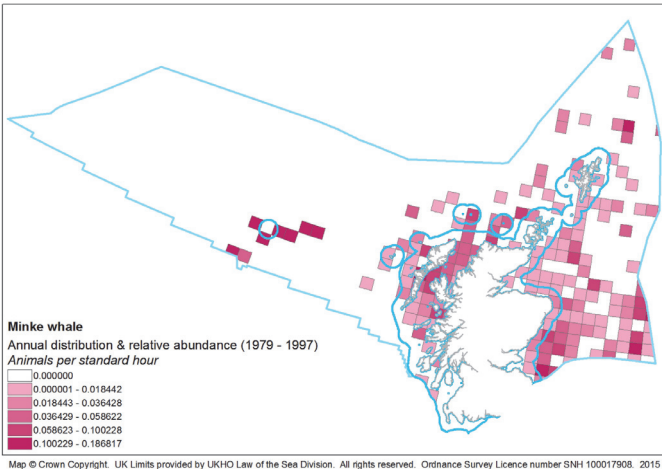
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
BOTTLENOSE DOLPHIN - <i>TURSIOPS TRUNCATUS</i> <i>Other name(s)</i> - common bottlenose dolphin, bottlenosed dolphin	Whales, dolphins and porpoises <i>Recent synonym</i> - none
Image	Distribution
 <div>Image: Lorne Gill / SNH</div>	 <p>Bottlenose dolphin Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.0000000.000001 - 0.1596720.159673 - 0.4220860.422087 - 1.6543831.654384 - 3.3586103.358611 - 5.749027 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Bottlenose dolphins are one of the best known dolphins in the UK and can grow up to 4m long, live for 19-26 years and reach breeding age at 5-14 years. They are characterised by a dark to light grey back, a white underside, a pronounced short beak and a gently curving mouthline which resembles a smile. Social animals, they occur in pods of 15-25 individuals and are known to ride the bow waves of boats and engage in acrobatic leaps.</p> <p>Habitat - Occur in areas of open coast, as well as in offshore waters, straits/sounds, sea lochs, estuaries and occasionally the lower reaches of rivers.</p> <p>Feeding - Feed on a wide variety of marine fish (including hake, eels, salmon, mullet, bass and sandeels), squid and octopus.</p> <p>Scottish distribution - A 'resident' population of bottlenose dolphins is known from the east coast of Scotland, stretching from the Moray Firth to the Firth of Tay. The Moray Firth is designated as a Special Area of Conservation for this species under European legislation (Habitats Directive). Bottlenose dolphins are also recorded southwards of the Firth of Tay along the east coast, as well as around the Inner and Outer Hebrides on the west coast, and in offshore waters.</p> <p>Wider distribution - Resident populations are found in Cardigan Bay (Wales) and off the west coast of Ireland. Also recorded off the south and south-west coasts of England, the English Channel, North Sea and the Irish Sea. Recorded from tropical and temperate waters worldwide.</p> <p>Feature status - Bottlenose dolphins are sensitive to noise disturbance (e.g. from shipping, oil and gas operations and offshore developments), dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch. Possible disturbance may also come from wildlife watching.</p>	
Natural heritage importance	Information sources
ASCOBANS CITES Appendix II EC Habitats Directive Annexes II & IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide


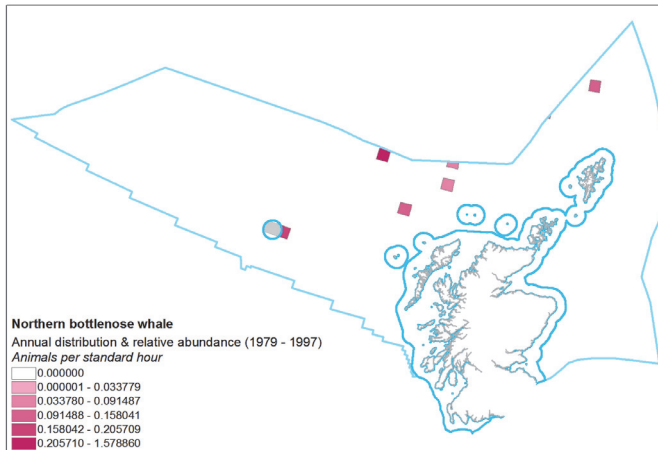
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
FIN WHALE - <i>BALAENOPTERA PHYSALUS</i>		Whales, dolphins and porpoises
<i>Other name(s)</i> - fin whale, common rorqual		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: C. Swann / Sea Watch Foundation</p>	 <p>Fin whale Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.000001 - 0.0128080.012809 - 0.0350220.035023 - 0.0926690.092670 - 0.2178900.217891 - 1.936673 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - The fin whale is the second largest of all whales, after the blue whale, and can grow up to 24m in length. They have a V-shaped head with a central ridge and a relatively small dorsal fin and are a uniform slate grey in colour with an asymmetric white patch along the lower lip and palate.</p> <p>Habitat - Most commonly recorded in deep waters (400-2000m depth) beyond the edge of the continental shelf. In Europe the species is usually found in water depths >500m. They appear to favour topographic rises such as banks and mounds, and areas of oceanic upwelling such as fronts where high concentrations of plankton can accumulate.</p> <p>Feeding - Primarily feed on planktonic crustaceans, although there are reports of feeding on small shoaling fish species such as herring. Fin whales use a variety of feeding methods such as engulfing prey from behind, to side- and lunge-feeding involving herding of prey into tight concentrations.</p> <p>Scottish distribution - Beyond the edge of the continental shelf in northern waters and around Rockall.</p> <p>Wider distribution - Occur worldwide, mainly in temperate and polar offshore waters. The range of the North Atlantic population extends as far as Svalbard (Norway) in the north-east (but rarely far into the Barents Sea), to the Davis Strait and Baffin Bay (Canada and Denmark (Greenland)) in the north-west (but rarely into the inner Canadian Arctic), to the Canary Islands (Spain) in the south-east, and to the Antilles in the south-west, but it is rare in the Caribbean and Gulf of Mexico.</p> <p>Conservation status - Catches ceased in the North Atlantic by 1990, except for small “aboriginal subsistence” catches off Greenland. Although in 2006 commercial catches resumed off Iceland (with 9 being taken that year) it seems unlikely that fin whale harvest will return to high levels due to limited market demand. Fin whales are one of the more commonly recorded species reported in vessel collisions and are occasionally caught in fishing gear as bycatch, although such deaths have not been observed in UK waters. Both casual sightings and stranding rates suggest an increase in numbers since the 1980s.</p>		
Natural heritage importance		Information sources
CITES Appendix I EC Habitats Directive Annex IV IUCN Red List (Endangered) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V		IUCN Red List of Threatened Species JNCC Cetacean Atlas UK CSIP annual reports


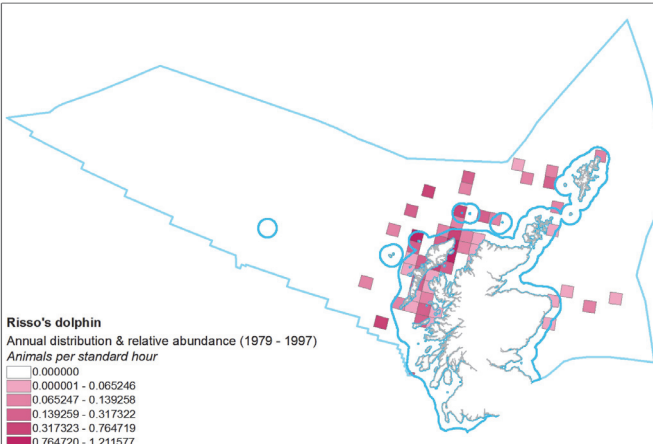
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
HARBOUR PORPOISE - <i>PHOCOENA PHOCOENA</i>	Whales, dolphins and porpoises
<i>Other name(s)</i> - common porpoise	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: M. Reichelt / Sea Watch Foundation</p>	 <p>Harbour porpoise Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.0000000.000001 - 0.0354410.035442 - 0.0901910.090192 - 0.1681100.168111 - 0.2832680.283269 - 0.529662 <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>Characteristics - Harbour porpoises are the smallest cetacean in UK waters. They reach a maximum length of 1.9m, live between 12 and 20 years and reach breeding age at 3-4 years. They have a plump body with a short blunt head, no beak and a small wide-based triangular fin in the centre of their backs. They can dive for as long as six minutes down to 220m to forage before surfacing to take a breath. They generally occur in small groups or singly.</p> <p>Habitat - Around areas of open coast, shallow bays, estuaries, sea lochs, tidal channels and occasionally up rivers. Important calving grounds have been identified in the North Sea.</p> <p>Feeding - Feed on a wide variety of small shoaling fish such as herring, cod, haddock, sandeels, squid, octopus and crustaceans.</p> <p>Scottish distribution - Recorded in all waters around Scotland.</p> <p>Wider distribution - Harbour porpoises are the most common small cetacean in the eastern North Atlantic, with a wide distribution in the waters of the northern hemisphere.</p> <p>Feature status - The number of harbour porpoises in Hebridean waters is amongst the highest in Europe. They are the most numerous cetacean found in UK waters and are considered under threat/in decline in the Greater North Sea and Celtic Sea. Harbour porpoise are particularly sensitive to noise disturbance (e.g. from shipping, oil and gas operations and offshore developments). Harbour porpoises are the most frequently stranded cetacean on the Scottish coast. Vessel collisions, dredging leading to the re-suspension of potentially harmful chemicals and incidental fisheries bycatch also pose a threat to harbour porpoise populations.</p>	
Natural heritage importance	Information sources
ASCOBANS CITES Appendix II EC Habitats Directive Annexes II & IV IUCN Red List (Least concern) OSPAR T&D Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide


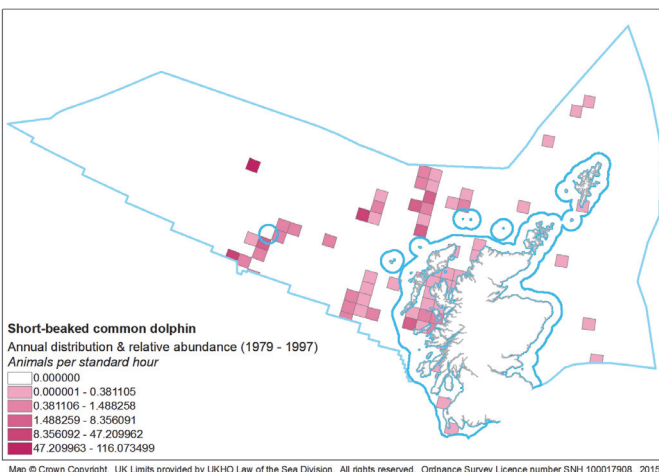
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
KILLER WHALE - <i>ORCINUS ORCA</i>	Whales, dolphins and porpoises
<i>Other name(s)</i> - orca, blackfish	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: M.E. Baines / Sea Watch Foundation</p>	 <p>Killer whale Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.0000000.000001 - 0.2273580.227359 - 0.6559650.655966 - 1.6786151.678616 - 3.5926423.592643 - 7.161922 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - One of the most identifiable of all whales, killer whales have a distinctive black and white colouring with an oval shaped white patch behind each eye. The upper fin of the killer whale is also very distinctive and can reach up to 1.8m tall in adult males. Killer whales can grow up to 7.5m (females) and 9m (males) in length, live between 50-60 years (females) and 80-90 years (males), and reach breeding age at 10-15 year (females) and 10 years (males). They are very acrobatic and most sightings are in groups of fewer than 8 individuals.</p> <p>Habitat - Occur in areas of open coast, straits/sounds, sea lochs and offshore. Most commonly sighted at higher latitudes.</p> <p>Feeding - Feed on a wide variety of prey species including seals, otters, eider ducks, squid and certain marine fish. Known to hunt cooperatively using distinctive sounds which may vary significantly between groups.</p> <p>Scottish distribution - Occur in all waters, with sightings concentrated around the Isle of Mull on the west coast, the north-east coast, Shetland and Orkney.</p> <p>Wider distribution - In the UK, they are scarce outside Scotland. They occur in all marine regions from tropical to polar waters. The killer whale is widely distributed across the North Atlantic, particularly around Iceland and Norway.</p> <p>Feature status - Killer 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.</p>	
Natural heritage importance	Information sources
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Data deficient) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas MarLIN NAKID Project SMRU Ltd. WDC Species Guide


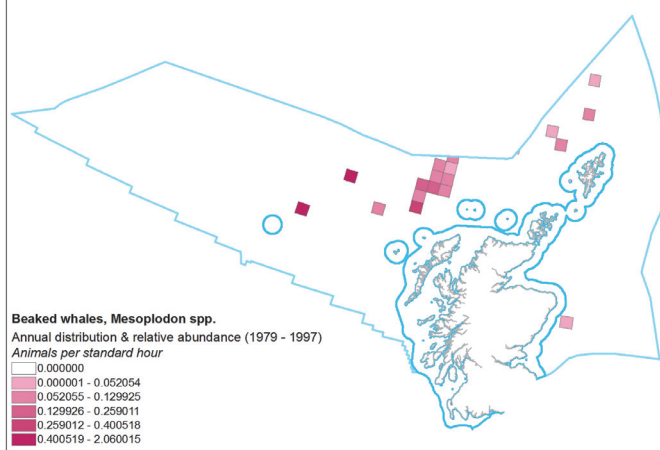
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
LONG-FINNED PILOT WHALE - <i>GLOBICEPHALA MELAS</i>		Whales, dolphins and porpoises
<i>Other name(s)</i> - blackfish		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: M.E. Baines / Sea Watch Foundation</p>	 <p>Long-finned pilot whale Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.000001 - 0.5969480.596949 - 1.3023421.302343 - 2.4318222.431823 - 7.4761047.476105 - 39.098442 <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>	
Feature description		
<p>Characteristics - Long-finned pilot whales have a stocky body which is predominantly black or light grey in colour, a bulbous head and very broad upper fin. Males grow up to 6.7m and females up to 5.7m in length. Males can live up to 40 years and reach breeding age at 12 years. Females can live up to 60 years and reach breeding age at 8 years. This highly social species is often observed in mixed species groups, normally in pods of between 20-90 individuals and most notably in association with bottlenose or Atlantic white-sided dolphins.</p> <p>Habitat - Long-finned pilot whales are usually found in deep waters (200-3000m), seaward of and along the edges of the continental shelf but will enter more coastal areas on a seasonal basis as they follow their prey inshore.</p> <p>Feeding - Feed on squid mainly but also on a variety of fish species such as mackerel.</p> <p>Scottish distribution - Long-finned pilot whales are not commonly seen in Scottish waters. Sightings are limited to the Moray Firth, the Hebrides, and north-west of Shetland. The majority of sightings occur in waters greater than 200m deep.</p> <p>Wider distribution - Found in oceanic and some coastal waters of the North Atlantic, including the Mediterranean Sea and North Sea. Another population is found in the southern hemisphere.</p> <p>Feature status - Long-finned pilot 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. They are one of the most frequently reported species involved in mass strandings. Globally, including areas of the north-eastern Atlantic, dedicated hunts for this species still take place.</p>		
Natural heritage importance		Information sources
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Data deficient) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V		JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide


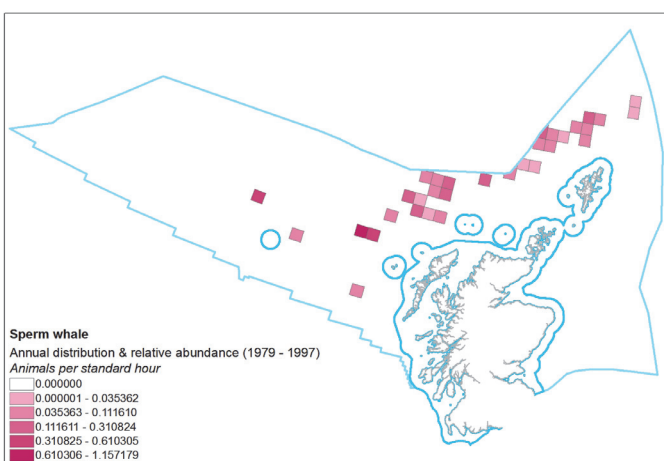
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS						
Common name - <i>Scientific name</i>	Species group						
MINKE WHALE - <i>BALAENOPTERA ACUTOROSTRATA</i>	Whales, dolphins and porpoises						
<i>Other name(s)</i> - lesser rorqual	<i>Recent synonym</i> - none						
Image	Distribution						
 <div>Image: David Ainsley</div>	 <p>Minke whale Annual distribution & relative abundance (1979 - 1997) <i>Animals per standard hour</i></p> <table><tr><td>0.000000</td></tr><tr><td>0.000001 - 0.018442</td></tr><tr><td>0.018443 - 0.036428</td></tr><tr><td>0.036429 - 0.058622</td></tr><tr><td>0.058623 - 0.100228</td></tr><tr><td>0.100229 - 0.186817</td></tr></table> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	0.000000	0.000001 - 0.018442	0.018443 - 0.036428	0.036429 - 0.058622	0.058623 - 0.100228	0.100229 - 0.186817
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0.000001 - 0.018442							
0.018443 - 0.036428							
0.036429 - 0.058622							
0.058623 - 0.100228							
0.100229 - 0.186817							
Feature description							
<p>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 are capable of leaping clear of the water. Group sizes tend to be small (1-3 individuals) but larger numbers may aggregate in areas of increased food availability.</p> <p>Habitat - Areas of open coast, straits/sounds and sea lochs, occasionally recorded in deep offshore waters.</p> <p>Feeding - Feed primarily on invertebrates and small schooling fish such as sandeels and mackerel.</p> <p>Scottish distribution - Occurs throughout Scottish waters.</p> <p>Wider distribution - Widely distributed from the tropics to subpolar regions. Their migration patterns are not fully understood.</p> <p>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.</p>							
Natural heritage importance	Information sources						
CITES Appendix I EC Habitats Directive Annex IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas SNH habitat modelling analysis for minke whale MarLIN SMRU Ltd. WDC Species Guide						


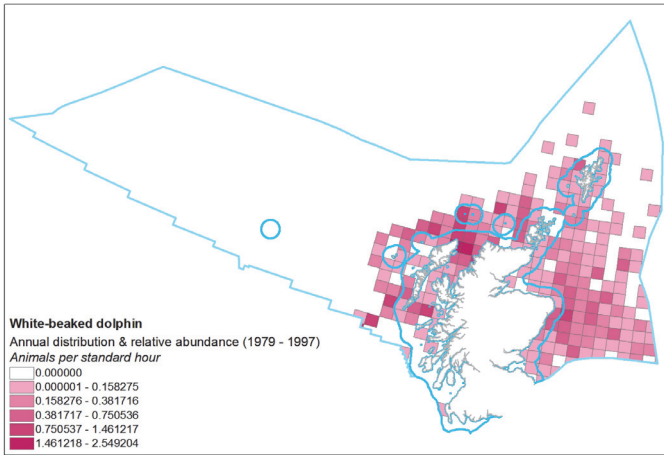
MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
NORTHERN BOTTLENOSE WHALE - <i>HYPEROODON AMPULLATUS</i>		Whales, dolphins and porpoises
Other name(s) - North Atlantic bottlenose whale, bottle-nosed whale or bottlenose whale		Recent synonym - <i>Hyperoodon latifrons</i> , <i>Hyperoodon bidens</i>
Image	Distribution	
 <p>Image: S.Hooker / Sea Watch Foundation</p>	 <p>Northern bottlenose whale Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.0000000.000001 - 0.0337790.033780 - 0.0914870.091488 - 0.1580410.158042 - 0.2057090.205710 - 1.578860 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - The northern bottlenose whale is the largest of the beaked whales occurring in Scottish waters, growing up to 9.5m in length. They have a large bulbous forehead (which is flatter in older males), a hooked dorsal fin and a distinct short dolphin-like beak. Northern bottlenose whales vary in colour from chocolate brown to yellowish-brown or dark grey (caused by a type of plankton which coats the skin). The animals are generally lighter on their flanks and undersides, with irregular patches or blotches. In males, the forehead becomes lighter with age.</p> <p>Habitat - Primarily found in cold temperate to subarctic deep waters, mostly beyond the continental shelf (and generally over 500-1500m in depth) near submarine canyons. They sometimes travel several kilometres into broken ice fields, but are more common in open water.</p> <p>Feeding - Feed primarily on squid, but occasionally fish such as herring, Greenland halibut, lumpsucker and redfish, and invertebrates such as sea cucumbers, starfish, and large crustaceans. They do much of their feeding on or near the sea bed in very deep water (> 800m in depth).</p> <p>Scottish distribution - Most records are from beyond the shelf edge to the north-west of Scotland in the summer months. Thought to migrate north in spring, returning south in autumn.</p> <p>Wider distribution - Northern bottlenose whales are found only in temperate and Arctic North Atlantic waters, from the ice-edge to Azores. The best known sub-population occurs in the waters over “The Gully” - a large submarine canyon off Nova Scotia, Canada.</p> <p>Feature status - Although the species has been essentially unexploited for almost 30 years, a few animals are taken in the Faroe Islands annual drive. The species is recorded stranding on all British coasts with the majority in Scottish waters in recent years.</p>		
Natural heritage importance		Information sources
ASCOBANS CITES Appendix I EC Habitats Directive Annex IV IUCN Red List (Data deficient) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V		JNCC Cetacean Atlas IUCN Red List of Threatened Species UK CSIP annual reports

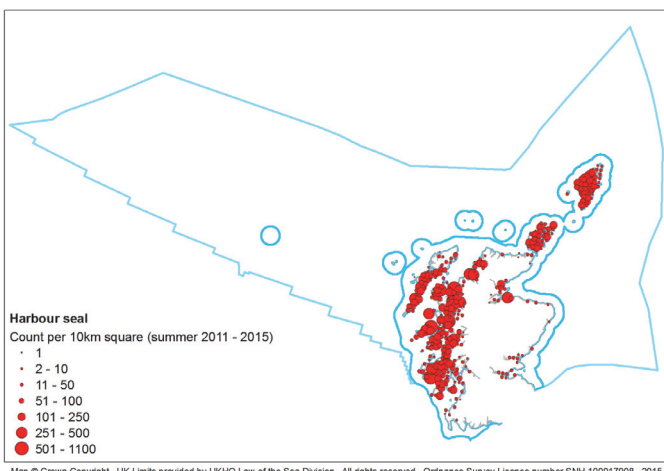
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS						
Common name - <i>Scientific name</i>	Species group						
Risso's DOLPHIN - <i>GRAMPUS GRISEUS</i>	Whales, dolphins and porpoises						
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none						
Image	Distribution						
 <p>Image: P.G.H.Evans / Sea Watch Foundation</p>	 <p>Risso's dolphin Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <table><tr><td>0.000000</td></tr><tr><td>0.000001 - 0.065246</td></tr><tr><td>0.065247 - 0.139258</td></tr><tr><td>0.139259 - 0.317322</td></tr><tr><td>0.317323 - 0.764719</td></tr><tr><td>0.764720 - 1.211577</td></tr></table> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	0.000000	0.000001 - 0.065246	0.065247 - 0.139258	0.139259 - 0.317322	0.317323 - 0.764719	0.764720 - 1.211577
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0.065247 - 0.139258							
0.139259 - 0.317322							
0.317323 - 0.764719							
0.764720 - 1.211577							
Feature description							
<p>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 darker and more uniform shade of grey than adults, while adults have white scarring on the body, which typically increases over time. 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>							
Natural heritage importance	Information sources						
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas SNH habitat modelling analysis for Risso's dolphin MarLIN SMRU Ltd. WDC Species Guide						


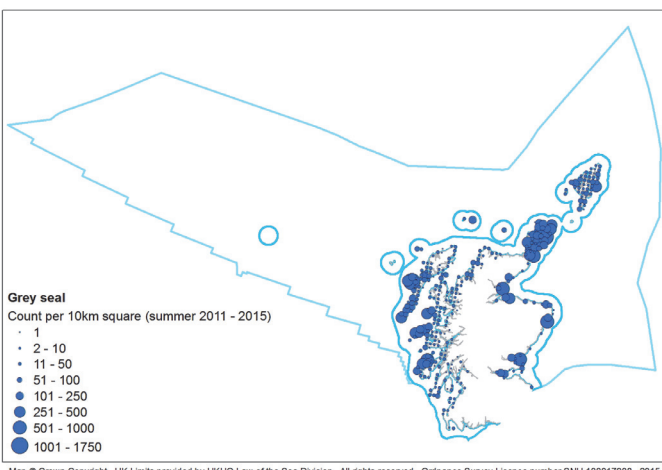
MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS						
Common name - <i>Scientific name</i>	Species group						
SHORT-BEAKED COMMON DOLPHIN - <i>DELPHINUS DELPHIS</i>	Whales, dolphins and porpoises						
<i>Other name(s)</i> - common dolphin	<i>Recent synonym</i> - none						
Image	Distribution						
 <div>Image: SNH</div>	 <p>Short-beaked common dolphin Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <table><tr><td>0.000000</td></tr><tr><td>0.000001 - 0.381105</td></tr><tr><td>0.381106 - 1.488258</td></tr><tr><td>1.488259 - 8.356091</td></tr><tr><td>8.356092 - 47.209962</td></tr><tr><td>47.209963 - 116.073499</td></tr></table> <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>	0.000000	0.000001 - 0.381105	0.381106 - 1.488258	1.488259 - 8.356091	8.356092 - 47.209962	47.209963 - 116.073499
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8.356092 - 47.209962							
47.209963 - 116.073499							
Feature description							
<p>Characteristics - This dolphin can reach up to 2.7m in length and weigh up to 200kg, live up to 25 years and reach breeding age at 3-12 years (males) and 2-7 years (females). They have a very distinctive coloration with a dark grey back, white underside and a figure of eight hourglass pattern on their flanks, with a pale yellow patch towards the front and a lighter grey patch at the back end. This species occasionally forms large groups comprising thousands of individuals. Common dolphins are quite acrobatic and have been known to ride the bow waves of boats.</p> <p>Habitat - Areas of open coast, offshore seabed habitats, straits/sounds, sea lochs and estuaries. Common dolphins have a preference for areas where the sea bed is steep (e.g. seamounts) and occur in offshore waters primarily.</p> <p>Feeding - Feed on small schooling fish and squid.</p> <p>Scottish distribution - Common in the Sea of Hebrides and the southern part of the Minch, particularly in summer. Relatively high numbers are encountered in summer off the west and the north of Coll & Tiree.</p> <p>Wider distribution - Occur in both temperate and tropical waters of the Pacific and the Atlantic. Separate populations occur in the Mediterranean and Baltic.</p> <p>Feature status - Like all cetaceans, common 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 compounds and incidental fisheries bycatch.</p>							
Natural heritage importance	Information sources						
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide						

MOBILE SPECIES	OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
<p>SOWERBY'S BEAKED WHALE - <i>MESOPLODON BIDENS</i></p> <p>Other name(s) - Sowerby's whale, North Sea beaked whale</p>	<p>Whales, dolphins and porpoises</p> <p>Recent synonym - <i>Physeter bidens</i></p>
Image	Distribution
 <p>Image: J. Benny / Sea Watch Foundation</p>	 <p>Beaked whales, <i>Mesoplodon</i> spp. Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <p>0.000000 0.000001 - 0.052054 0.052055 - 0.129925 0.129926 - 0.259011 0.259012 - 0.400518 0.400519 - 2.060015</p> <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>
Feature description	
<p>Characteristics - Sowerby's beaked whales have a distinctive and prominent forehead bulge and a long slender beak, with a sickle-shaped dorsal fin situated almost two thirds of the way along their back. They tend to be dark grey in colour with a paler underside and light spots. Adult males can be distinguished by single linear stripes scattered over their back and flanks whereas young animals tend to have lighter undersides than adults and have fewer spots.</p>	
<p>Habitat - Occur almost exclusively in deep waters beyond the continental shelf edge.</p>	
<p>Feeding - Poorly known, but thought to feed on squid, whitefish and sandeels.</p>	
<p>Scottish distribution - Most of the UK beaked whale records are from the north-west. As beaked whale sightings at sea are often not identified to species level, the mapping above reflects what is known about beaked whales of the genus <i>Mesoplodon</i> in general. Beaked whale distribution is considered likely to be indicative of Sowerby's beaked whale distribution.</p>	
<p>Wider distribution - Sowerby's beaked whale is only known from the North Atlantic, where it is found in warm and cool temperate waters, with a more northerly range than others of the same genus.</p>	
<p>Feature status - There is little specific information on the status or threats to Sowerby's beaked whales. Some are known to have been incidentally killed by whalers in Newfoundland, Iceland, and in the Barents Sea, and a few entanglements in fishing gear (e.g. driftnets) have been documented. This species, like other beaked whales, is likely to be sensitive to the effects of underwater noise.</p>	
Natural heritage importance	Information sources
<p>ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Data deficient) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V</p>	<p>IUCN Red List of Threatened Species JNCC Cetacean Atlas JMBA Marine Biodiversity Records UK CSIP annual reports</p>

MOBILE SPECIES		OFFSHORE WATERS
Common name - <i>Scientific name</i>		Species group
SPERM WHALE - <i>PHYSETER MACROCEPHALUS</i>		Whales, dolphins and porpoises
<i>Other name(s)</i> - none		<i>Recent synonym</i> - <i>Physeter catodon</i>
Image	Distribution	
 <p>Image: Evelyn Philpott</p>	 <p>Sperm whale Annual distribution & relative abundance (1979 - 1997) Animals per standard hour</p> <ul style="list-style-type: none">0.0000000.000001 - 0.0353620.035363 - 0.1116100.111611 - 0.3108240.310825 - 0.6103050.610306 - 1.157179 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	
Feature description		
<p>Characteristics - The largest of the toothed whales; adult females can be up to 12m long and adult males up to 18m long. The sperm whale head is huge - up to a third of its total body length. The blowhole is offset to the left, producing a distinctive angled blow. The sperm whale has a hump rather than an upper fin. They are very deep divers, reaching depths of up to 3000m for over an hour.</p> <p>Habitat - Typically found in continental slope and oceanic waters of depths greater than 1000m.</p> <p>Feeding - Squid but also various species of fish.</p> <p>Scottish distribution - Generally limited to deep waters off the continental shelf but have also been observed off Shetland.</p> <p>Wider distribution - Occur in deep waters worldwide, from the tropics to the poles.</p> <p>Conservation status - Historically targeted heavily by the whaling industry the sperm whale is now classified by the IUCN as 'Vulnerable'. They 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, bycatch and collisions from ships.</p>		
Natural heritage importance		Information sources
CITES Appendix I EC Habitats Directive Annex IV IUCN Red List (Vulnerable) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V		JNCC Cetacean Atlas MarLIN SMRU Ltd. WDC Species Guide

MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS						
Common name - <i>Scientific name</i>	Species group						
WHITE-BEAKED DOLPHIN - <i>LAGENORHYNCHUS ALBIROSTRIS</i>	Whales, dolphins and porpoises						
<i>Other name(s)</i> - none	<i>Recent synonym</i> - none						
Image	Distribution						
 <p>Image: P.G.H.Evans / Sea Watch Foundation</p>	 <p>White-beaked dolphin Annual distribution & relative abundance (1979 - 1997) <i>Animals per standard hour</i></p> <table><tr><td>0.000000</td></tr><tr><td>0.000001 - 0.158275</td></tr><tr><td>0.158276 - 0.381716</td></tr><tr><td>0.381717 - 0.750536</td></tr><tr><td>0.750537 - 1.461217</td></tr><tr><td>1.461218 - 2.549204</td></tr></table> <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>	0.000000	0.000001 - 0.158275	0.158276 - 0.381716	0.381717 - 0.750536	0.750537 - 1.461217	1.461218 - 2.549204
0.000000							
0.000001 - 0.158275							
0.158276 - 0.381716							
0.381717 - 0.750536							
0.750537 - 1.461217							
1.461218 - 2.549204							
Feature description							
<p>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.</p> <p>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.</p> <p>Feeding - Feeds on small pelagic fish (e.g. herring and haddock), crustaceans, squid and octopus. They have been observed feeding cooperatively, herding schools of fish together and trapping them against the surface.</p> <p>Scottish distribution - Abundant in all Scottish waters but concentrated around the Hebrides, Orkney and Shetland.</p> <p>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.</p> <p>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. Some hunting for white-beaked dolphins still occurs off the coasts of Greenland and Canada.</p>							
Natural heritage importance	Information sources						
ASCOBANS CITES Appendix II EC Habitats Directive Annex IV IUCN Red List (Least concern) Scottish Biodiversity List UK BAP Wildlife and Countryside Act 1981 Schedule V	SMRU Ltd. SNH habitat modelling analysis for white-beaked dolphin MarLIN JNCC Cetacean Atlas WDC Species Guide						

MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
HARBOUR SEAL - <i>PHOCA VITULINA</i>	Seals
<i>Other name(s)</i> – Common seal, Eastern Atlantic harbour seal	<i>Recent synonym</i> - none
Image	Distribution
 <div>Image: Lorne Gill / SNH</div>	 <p>Harbour seal Count per 10km square (summer 2011 - 2015)</p> <ul style="list-style-type: none">12 - 1011 - 5051 - 100101 - 250251 - 500501 - 1100 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Harbour seals are the smaller of the two seal species found in Scotland. Adult males can be up to 1.9m long and weigh 80-100kg. They can live for 30 years and reach reproductive maturity at 4-5 years of age. Females can be up to 1.7m long and weigh 60-110kg. They can live for 30 years and reach breeding age at 3-5 years. Their fur is uniformly spotted and their eyes are very close to their nose, which helps distinguish them from grey seals. They pup in June and July, and moult in August.</p> <p>Habitat - Found at sea on the open coast, in estuaries, sea lochs and even rivers. They come ashore (haul-out) at sites where sandbars, beaches or rocks are uncovered at low tide.</p> <p>Feeding - Feed on marine fish (including sandeels, gadoids, herring, sprat and flatfish), octopus and squid although diet varies seasonally and regionally. Known to forage up to 50km off the coast.</p> <p>Scottish distribution - Widely distributed throughout Scottish waters but with significant concentrations on the west coast, the Hebrides and historically throughout the Northern Isles and within the major firths on the east coast, where numbers have declined.</p> <p>Wider distribution - Coastal areas across the northern hemisphere. There are 5 subspecies. The UK subspecies occurs in the eastern Atlantic from north Portugal to Svalbard and the Barents Sea.</p> <p>Feature status - Approximately 85% of the UK's harbour seal population are found in Scottish waters. Recent surveys indicate significant population declines in Orkney, Shetland and the Firth of Tay since 2000. Only the west coast populations appear to be stable/ increasing at levels equivalent to, or greater than, those seen in the 1990s, while Moray Firth populations appear to be stabilising after a period of decline. Harbour seals are sensitive to a number of anthropogenic effects including anti-predator shooting at fish farms and fisheries, bioaccumulation of toxic compounds and underwater noise disturbance.</p>	
Natural heritage importance	Information sources
EC Habitats Directive Annexes II & V IUCN Red List (Least concern) Scottish Biodiversity List UK BAP	MarLIN SMRU Ltd. Special Committee on Seals (SCOS)

MOBILE SPECIES	TERRITORIAL AND OFFSHORE WATERS
Common name - <i>Scientific name</i>	Species group
GREY SEAL - <i>HALICHOERUS GRYPUS</i>	Seals
<i>Other name(s)</i> - Atlantic grey seal	<i>Recent synonym</i> - none
Image	Distribution
 <p>Image: Lorne Gill / SNH</p>	 <p>Grey seal Count per 10km square (summer 2011 - 2015)</p> <ul style="list-style-type: none">• 1• 2 - 10• 11 - 50• 51 - 100• 101 - 250• 251 - 500• 501 - 1000• 1001 - 1750 <p><small>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</small></p>
Feature description	
<p>Characteristics - Grey seals are the larger of the two seal species found in Scotland. Adult males can be up to 2m long and weigh over 300kg. They can live for 20 years and reach reproductive maturity 8-10 years of age. Adult females can be up to 1.8m long and weigh 150-200kg. They can live for 30 years and reach breeding age at 4-5 years. Pups are born with white coats, are 90-105cm in length and weigh around 15kg. Adults have contrasting pale bellies and grey backs, with large irregular shaped spots and blotches. They pup from October to December.</p> <p>Habitat - Found at sea on the open coast, in estuaries and rivers. Between foraging trips they come ashore (haul-out) at sites where sandbars, beaches or rocks are uncovered at low tide.</p> <p>Feeding - Generalists, they feed on marine fish (including sandeels, whitefish and flatfish). Grey seals forage up to 100km from their haul-out sites, and are wide ranging outside the breeding season.</p> <p>Scottish distribution - Widely distributed but with significant concentrations in Orkney and around the Hebrides.</p> <p>Wider distribution - 45% of the global population of grey seals are found in British waters. There are also population centres in north-east Canada and the Baltic.</p> <p>Feature status - Over 90% of the UK's grey seal population breed in Scotland. Pup production is stable or slowly increasing. Grey seals are sensitive to a number of anthropogenic activities including anti-predator shooting at fish farms and fisheries, noise disturbance and bioaccumulation of toxic compounds.</p>	
Natural heritage importance	Information sources
EC Habitats Directive Annexes II & V IUCN Red List (Least concern)	MarLIN SMRU Ltd. Special Committee on Seals (SCOS)

MOBILE SPECIES		TERRITORIAL WATERS
Common name - <i>Scientific name</i>		Species group
OTTER - <i>LUTRA LUTRA</i>		Otter
<i>Other name(s)</i> - Eurasian river otter, common otter		<i>Recent synonym</i> - none
Image	Distribution	
 <p>Image: Laurie Campbell</p>	 <p>Map © Crown Copyright. UK Limits provided by UKHO Law of the Sea Division. All rights reserved. Ordnance Survey Licence number SNH 100017908. 2015</p>	
Feature description		
<p>Characteristics - Eurasian otters have brown fur, often paler on the underside, and a long lithe body with a thick tail, short legs and webbed feet. They have very dense, short fur which traps a layer of air to insulate the animal in water. They are predominately solitary animals: if two or more otters are seen together, they will usually comprise an adult female with cub(s) and can be quite playful. Adults can reach up to 1.1m in length, weigh 7-12kg and live for typically 3-4 years in the wild (exceptionally up to 16 years in captivity). Male otters reach reproductive maturity at 18 months, females at 24 months. In fresh waters, otters are mainly nocturnal, whereas in coastal habitats they are largely active by day.</p> <p>Habitat - They are semi-aquatic animals, occurring in lakes, rivers, estuaries and coastal waters. Populations along the coast use shallow, inshore areas for feeding but require fresh water for washing salt from their fur and terrestrial areas for resting and breeding. Piles of boulders are commonly used as holts (underground places of shelter) in coastal areas.</p> <p>Feeding - Feed mainly on fish, but also amphibians, crustaceans and, to a lesser extent, on birds and small mammals. Sensitive whiskers around the snout are used to help detect prey in murky water.</p> <p>Scottish distribution - 90% of the total UK population reside in Scotland. 50% are coastal dwelling otters which feed at sea. The coast and islands of western Scotland and Shetland are particularly important otter habitat. Within Shetland, the Yell Sound area has the highest otter densities.</p> <p>Wider distribution - Also occurs in much of England and Wales and throughout Ireland. The Eurasian otter ranges across Europe to southern Russia, south to Italy, North Africa and the Middle East, through the Himalayas to south east Asia and as far as Sumatra.</p> <p>Feature status – Populations have largely recovered following steep declines over much of Britain during the 1960s and 1970s, mainly as a result of pesticides, although the decline in Scotland was less marked. Particularly sensitive to road traffic accidents, incidental fisheries bycatch (particularly potting) and the effects of bioaccumulating chemical pollutants.</p>		
Natural heritage importance		Information sources
CITES Appendix I EC Habitats Directive Annexes II & IV IUCN Red List (Near threatened) Scottish Biodiversity List UK BAP		Arkive species account International Otter Survival Fund SNH Trend note. Trends of Otters in Scotland SNH - Otters and development

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