Descriptions of habitats on the OSPAR List of threatened and/or declining species and habitats

(OSPAR Agreement: 2008-07)[1]

Contents

[1] Supersedes 2004-7 including amendments agreed by BDC 2006 (BDC 2006 Summary Record (BDC 06/10/1) § 3.32) and BDC 2008 (BDC 2008 Summary Record (BDC 08/12/1) § 4.22). Revised in 2021 to include Haploops habitat and Kelp forest habitat

Introduction

These descriptions of the habitats on the initial OSPAR list of threatened and/or declining species and habitats should act as working definitions for the purpose of collating information on their distribution and extent within the OSPAR area. Equivalent codes for each habitat in the EEA's EUNIS habitat classification (2004 version; http://eunis.eea.eu.int/eunis/habitats.jsp) and the National Marine Habitat Classification for Britain and Ireland (May 2004 version; www.jncc.gov.uk/MarineHabitatClassification) are given wherever possible, but it should be noted that the OSPAR habitats may not directly equate to those defined in these classifications.

For a habitat to occur at a site, it should extend over an area of at least 25m^2, but this threshold may need to be higher in offshore areas due to limitations of surveys and sampling. When a habitat type is known to have occurred in the past, but no longer occurs, it should be reported, clearly stating the date of the record and if possible when it disappeared. For some habitat types (e.g. biogenic reefs), the habitat-forming species (e.g. *Mytilus*, *Modiolus*, *Sabellaria*, *Zostera*) may occur in clumps or patches on the shore or seabed. Guidance has been given in each definition as to the expected minimum density or percentage coverage of such clumps or patches within the overall extent of the habitat. Where accumulations of dead material of the habitat- forming species occur either in association with live material, or indicate that the habitat-forming species was likely to have lived at the site, it can be reported as a record for the habitat type, duly noting its current condition Expert judgment will need to be applied on a site by site basis to determine whether the overall density, coverage and extent of the habitat-forming species is sufficient for the habitat-type to be considered to occur on the site. Practical application of these figures may lead to their adjustment.

Carbonate mounds

EUNIS code: A6.75

National Marine Habitat Classification for UK & Ireland code: Not defined

Carbonate mounds are distinct elevations of various shapes, which may be up to 350m high and 2km wide at their base (Weering *et al*, 2003). They occur offshore in water depths of 500-1100m with examples present in the Porcupine Seabight and Rockall Trough (Kenyon *et al,* 2003). Carbonate mounds may have a sediment veneer, typically composed of carbonate sands, muds and silts. The cold-water reef-building corals *Lophelia pertusa* and *Madrepora oculata*, as well as echiuran worms are characteristic fauna of carbonate mounds. Where cold-water corals (such as *Lophelia*) are present on the mound summit, coral debris may form a significant component of the overlying substratum.

There is currently speculation on the origin of carbonate mounds, with possible associations with fault-controlled methane seepage from deep hydrocarbon reservoirs, or gas-hydrate dissociation (Henriet *et al*, 1998) through to the debris from 'cold-water' coral colonies such as *Lophelia*.

Coral gardens

Habitat occurs within each of the following deep seabed EUNIS types:

A6.1 Deep-sea rock and artificial hard substrata

A6.2 Deep-sea mixed substrata

A6.3 Deep-sea sand

A6.4 Deep-sea muddy sand

A6.5 Deep-sea mud

A6.7 Raised features of the deep sea bed

A6.8. Deep sea trenches and canyons, channels, slope failures and slumps on the continental slope

A6.9 Vents, seeps, hypoxic and anoxic habitats of the deep sea

Where the coral garden communities found in the above EUNIS deep water habitats occur also in shallower water, such as in fjords or on the flanks of islands and seamounts (A6.7), they are also included in this definition

National Marine Habitat Classification for UK & Ireland code: Not defined

The main characteristic of a coral garden is a relatively dense aggregation of colonies or individuals of one or more coral species. Coral gardens can occur on a wide range of soft and hard seabed substrata. For example, soft-bottom coral gardens may be dominated by solitary scleractinians, sea pens or certain types of bamboo corals, whereas hard-bottom coral gardens are often found to be dominated by gorgonians, stylasterids, and/or black corals (ICES 2007).

The biological diversity of coral garden communities is typically high and often contains several species of coral belonging to different taxonomic groups, such as leather corals (Alcyonacea), gorgonians (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), hard corals (Scleractinia) and, in some places, stony hydroids (lace or hydrocorals: Stylasteridae). However, reef-forming hard corals (e.g. *Lophelia, Madrepora* and *Solenosmilia*), if present, occur only as small or scattered colonies and not as a dominating habitat component. The habitat can also include relatively large numbers of sponge species, although they are not a dominant component of the community. Other commonly associated fauna include basket stars (*Gorgonocephalus*), brittle stars, crinoids, molluscs, crustaceans and deep-water fish (Krieger and Wing 2002). Krieger and Wing (2002) conclude that the gorgonian coral *Primnoa* is both habitat and prey for fish and invertebrates and that its removal or damage may affect the populations of associated species.

Densities of coral species in the habitat vary depending on taxa and abiotic conditions, e.g. depth, current exposure, substrate). The few scientific investigations available indicate that smaller species (e.g. the gorgonians *Acanthogorgia* and *Primnoa*, and stylasterids) can occur in higher densities, e.g. 50 – 200 colonies per·100m^2, compared to larger species, such as *Paragorgia,* which may not reach densities of 1 or 2 per 100 m^2. Depending on biogeographic area and depth, coral gardens containing several coral species may in some places reach densities between 100 and 700 colonies per·100m^2. These densities merely indicate the biodiversity richness potential of coral gardens. In areas where the habitat has been disturbed, by for example, fishing activities, densities may be significantly reduced. Currently, it is not possible to determine threshold values for the presence of a coral garden as knowledge of the *in situ* growth forms and densities of coral gardens (or abundance of coral by-catch in fishing gear) is very limited, due to technical or operational restrictions. Visual survey techniques will hopefully add to our knowledge in the coming years.

Non-reef-forming cold-water corals occur in most regions of the North Atlantic, most commonly in water with temperatures between 3 and 8ºC (Madsen, 1944; Mortensen *et al*., 2006) in the north, but also in much warmer water in the south, e.g. around the Azores. Their bathymetric distribution varies between regions according to different hydrographic conditions, but also locally as an effect of topographic features and substrate composition. They can be found as shallow as 30 m depth (in Norwegian fjords) and down to several thousand meters on open ocean seamounts. The habitat is often subject to strong or moderate currents, which prevents silt deposition on the hard substrata that most coral species need for attachment. The hard substrata may be composed of bedrock or gravel/boulder, the latter often derived from glacial moraine deposition, whilst soft sandy/clayey sediments can also support cold-water corals (mostly seapens and some gorgonians within the Isididae).

Notes on practical identification and mapping of the habitat: Given the diversity of possible appearances of the habitat across the North East Atlantic, a more precise description of the habitat as it occurs in relation to different substrates, depths and regions will need to be developed. For individual locations, expert judgement is required to distinguish this habitat from surrounding habitats, including an assessment of the appropriate densities of octocoral species to constitute this habitat. As a first step to further clarification a site-by-site description of coral gardens is required that will lead to further refinement of this habitat definition and its inclusion in national and European habitat classifications. The habitat definition above does not encompass shelf and coastal water habitats with seapen and octocoral communities (for example *Alcyonium* spp. *Caryopyllia* spp.), including the OSPAR habitat 'seapens and burrowing megafauna' or deeper-water habitats where colonial scleractinian corals (*Lophelia pertusa* reefs) or sponges (Deep-sea sponge aggregations) dominate.

Cymodocea meadows

Cymodocea beds, Cymodocea meadows, Seagrass beds (Cymodocea nodosa Ucria (Ascherson), 1869

EUNIS Code: A5.531, A5.5312, A5.53131 and A5.53132

Cymodocea nodosa Ucria (Ascherson), 1869

Cymodocea nodosa forms large and dense patches with green leaves that can reach 100 cm long and 8 mm wide in well sorted fine sands or on superficial muddy sands in sheltered waters at depths of 1-30 meters. Frequently is mixed with other habitat forming phanerogams (*Zostera noltii* and *Zostera marina*) at muddy sands rich in organic nutrients. Shallow meadows of *Cymodocea* and *Zostera* are usually found in sheltered bays close to harbours, e.g. Cadiz Bay, or in areas subject to human impact.

C. nodosa has a tropical origin, nowadays restricted to the Mediterranean and scattered locations in the North Atlantic from southern Portugal and Spain to Senegal, including Canary Island and Madeira. Southern Portugal constitutes the current northern geographic limit of its distribution.

Deep-sea sponge aggregations

EUNIS code: A6.62

National Marine Habitat Classification for UK & Ireland code: Not defined

Deep sea sponge aggregations are principally composed of sponges from two classes: Hexactinellida and Demospongia. They are known to occur between water depths of 250-1300m (Bett & Rice, 1992), where the water temperature ranges from 4-10°C and there is moderate current velocity (0.5 knots). Deep-sea sponge aggregations may be found on soft substrata or hard substrata, such as boulders and cobbles which may lie on sediment. Iceberg plough-mark zones provide an ideal habitat for sponges because stable boulders and cobbles, exposed on the seabed, provide numerous attachment/settlement points (B. Bett, *pers comm.*). However, with 3.5kg of pure siliceous spicule material per m^2 reported from some sites (Gubbay, 2002), the occurrence of sponge fields can alter the characteristics of surrounding muddy sediments. Densities of occurrence are hard to quantify, but sponges in the class Hexactinellida have been reported at densities of 4-5 per m^2, whilst 'massive' growth forms of sponges from the class Demospongia have been reported at densities of 0.5-1 per m^2 (B. Bett, *pers comm.*). Deep-sea sponges have similar habitat preferences to cold-water corals, and hence are often found at the same location. Research has shown that the dense mats of spicules present around sponge fields may inhibit colonisation by infaunal animals, resulting in a dominance of epifaunal elements (Gubbay, 2002). Sponge fields also support ophiuroids, which use the sponges as elevated perches.

Haploops habitat

Muddy sediment dominated by *Haploops spp "Haploops* habitat"

Definition of habitat

Relationship to EUNIS: The habitat does not correspond directly to any EUNIS (2004) level 4 habitats due to the structure of the classification systems. The habitat is found in the following EUNIS level 4 habitats: 'Deep circalittoral mud' (A5.37), Circalittoral fine mud (A5.36) and Infralittoral fine mud (A5.34).

Other: Under the HELCOM HUB classification system (HELCOM 2013a, b, c) the *Haploops* habitat is known as "Baltic aphotic muddy sediment dominated by *Haploops* spp. (AB.H1l2)" and is characterized by epibenthic crustacea covering at least 10% of the seabed, providing biotic structures (perennial attached erect groups). Out of the epibenthic crustacea, Haploops spp. constitute at least 50 % of the biomass.

Definition of habitat, OSPAR Region II

Description and ecology: The *Haploops* habitat is built by small crustacean amphipods living in muddy substrates. They live in small, self-built tubes that rise a few centimeters above the seafloor and these can form dense mats. Soft-bottom habitats dominated by one or several of these species are called *Haploops* spp. communities or habitats, depending on the density of individuals. The *Haploops* habitat is in general characterised by high alpha-diversity of macroinvertebrates (tube worms, sea urchins, brittle stars) and is important as feeding grounds for many species of fish such as cod and several species of flatfish.

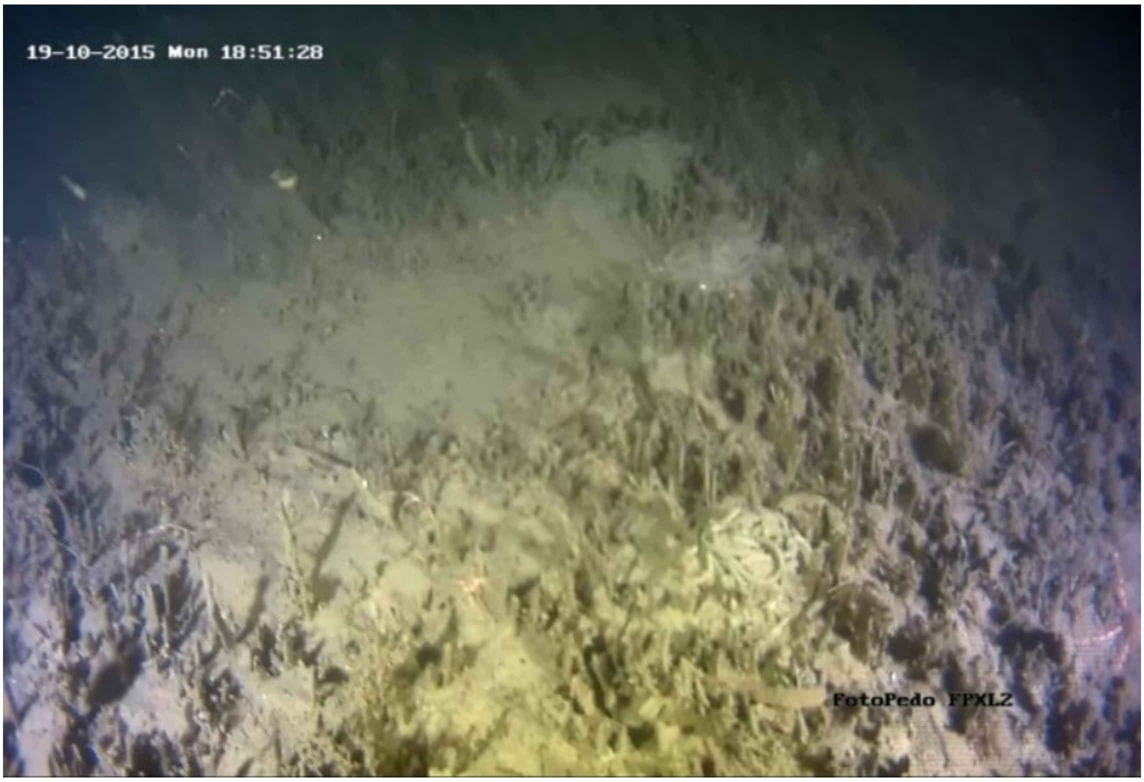
In the Kattegat of OSPAR Region II, the habitat regularly occurs below the halocline in conditions with relatively high salinity and low temperature. There are two species known to form the habitat in the Kattegat, namely *Haploops tenuis* and *Haploops tubicola.* Currently (2018) the genus comprises in total 27 species. *Haploops* species occur at varying depths ranging from 15 to 3000 m, but most of them are deep-water species.

Mapping of habitat: To qualify as '*Haploops* habitat', the habitat created by dense occurrence of *Haploops* needs to display a different structure compared to the surrounding homogenous muddy/fine sand or sediment habitat. The number of *Haploops* individuals should be 400 ind./m^{-2} or more, although with lower densities expert judgement should be sought to assess whether the qualification of *Haploops* spp. habitat is justified considering the regional/local context. For occurrence and possible patchiness of the habitat, expert judgement should be used to estimate whether the habitat has been present historically and later declined. When identifying a *Haploops* habitat the important factor is how the habitat structurally differs from the surrounding area.

This habitat definition takes into account that a biomass estimation through invasive sampling of *Haploops sp*. would not always be possible nor desirable. Given the threatened and declining status of the habitat in Region II, it would be preferable that only non-intrusive and non-destructive visual methods are used to monitor, survey and estimate *Haploops spp.* densities and habitat occurrence.

Occurrence: In OSPAR Region II very high densities of *Haploops* spp have been recorded historically in the Kattegat (in the national waters of Denmark and Sweden) where the population reached densities up to 4,000 ind./m^{-2} (Göransson *et al*. 2010). Later surveys indicate much lower densities (100 ind./m^{-2}) and even only 0-10 ind/m^{2} (from 2011 and on) where *Haploops* have almost disappeared from the area. A survey of several sites located in the Kattegat, completed as part of Danish monitoring activities under the EU MSFD (Styrelsen for Vand- og Naturforvaltning 2017=, recorded *Haploops* habitat with densities of 1,434 and 2,390 ind./m^{-2}.

Pictures of the Haploops habitat with high densities in the Kattegat region (OSPAR Region II):



Picture 1: *Haploops* habitat in Kattegat, Denmark (MSFD Area D). Indicative densities in the area: 2,390 *Haploops* ind./m^{2}. Photo /NST 2016-a/; Danish Environmental Protections Agency.

Picture 2: A bottom sample of *Haploops* spp. tubes from Kattegat, Denmark (OCEANA 2012). Indicative densities in the area not known.

Picture 3: Photo of Haploops habitat in the deep parts of Kattegat, Denmark. Photo taken by ROV (Oceana, April 2011). Indicative densities in the area not known.

Picture 4: Illustration of habitat from 36 meters depth north of Ven (Öresund) Typical species associated Haploops tubicola (1) Ophiura robusta (2) Pseudamussium peslutrae (3). Watercolour, illustrator: Sven-Bertil Johnsson, Öresundsfonden.

Intertidal *Mytilus edulis* beds on mixed and sandy sediments

EUNIS Code: A2.7211 and A2.7212

National Marine Habitat Classification for UK & Ireland code: LS.LMX.LMus.Myt.Mx and LS.LMX.LMus.Myt.Sa

Sediment shores characterised by beds of the mussel *Mytilus edulis* occur principally on mid and lower shore mixed substrata (mainly cobbles and pebbles on muddy sediments) but also on sands and muds. In high densities (at least 30% cover) the mussels bind the substratum and provide a habitat for many infaunal and epibiota species. This habitat is also found in lower shore tide-swept areas, such as in the tidal narrows of sealochs. A fauna of dense juvenile mussels may be found in sheltered firths, attached to algae on shores of pebbles, gravel, sand, mud and shell debris with a strandline of fucoids. Mussel beds on intertidal sediments have been reported all along the coast of Europe, particularly in UK, France, Netherlands and Germany.

Intertidal mudflats

EUNIS Code: A2.3

National Marine Habitat Classification for UK & Ireland code: LS.LMu

Two sub-types: 9.1 Marine intertidal mudflats

9.2 Estuarine intertidal mudflats

Intertidal mud typically forms extensive mudflats in calm coastal environments (particularly estuaries and other sheltered areas), although dry compacted mud can form steep and even vertical faces, particularly at the top of the shore adjacent to salt marshes. The upper limit of intertidal mudflats is often marked by saltmarsh, and the lower limit by Chart Datum. Sediments consist mainly of fine particles, mostly in the silt and clay fraction (particle size less than 0.063 mm in diameter), though sandy mud may contain up to 80% sand (mostly very fine and fine sand), often with a high organic content. Little oxygen penetrates these cohesive sediments, and an anoxic layer is often present within millimetres of the sediment surface.

Intertidal mudflats support communities characterised by polychaetes, bivalves and oligochaetes. This priority habitat has been divided into two sub-types, based on the predominant salinity regime.

Kelp forest

'Kelp forests' are defined as complex habitats created by large brown seaweeds mostly in the order Laminariales and some species of the order Tilopteridales (Bolton, 2016; Wernberg & Filbee-Dexter, 2019). They typically occur from the low intertidal down to shallow subtidal zones (approximately 40 m depth, depending on the water clarity with a depth limit at around 10% of incoming irradiance; Lüning, 1990) of temperate and polar coastal waters. As surface seawater temperature increases towards lower latitudes, kelp forests become excluded from shallow areas and restricted to deeper, cooler water (Graham *et al.*, 2007; Marzinelli *et al.*, 2015).

A kelp forest has a canopy formed by kelp stipes that hold fronds tens of centimetres to several metres above the substratum. This modifies the local environment to support a specific and distinct associated understorey and epibiotic community, which would not persist without the canopy (Fig. 1) (Flukes *et al.*, 2014; Leclerc *et al.*, 2015; Teagle *et al.*, 2017). A forest exhibits dense stands with the fronds forming an almost complete canopy (often referred as Leaf Area Index > 1; Pehlke & Bartsch, 2008) equivalent to having a stipe density of at least 3-5 adult stipes m^{-2} for the kelp species of the North-East Atlantic (Fig. 1). Depending on the latitude and environmental conditions, kelp forests have different kelp species assemblages and may show density variations for example after storms or winter die-back of annual sporophytes. Six canopy-forming species that may be locally dominant or occur in mixed assemblages with varying densities and are able to form dense canopies are considered here: the Laminariales *Alaria esculenta, Laminaria digitata, L. hyperborea, L. ochroleuca, Saccharina latissima* (formerly *Laminaria saccharina*), and the Tilopteridale *Saccorhiza polyschides* (Fig. 1).

An indicative list of corresponding EUNIS (2012) habitat codes is provided in Appendix I of the case report (Publication 2021/787) as a tool for mapping and classification exercise.

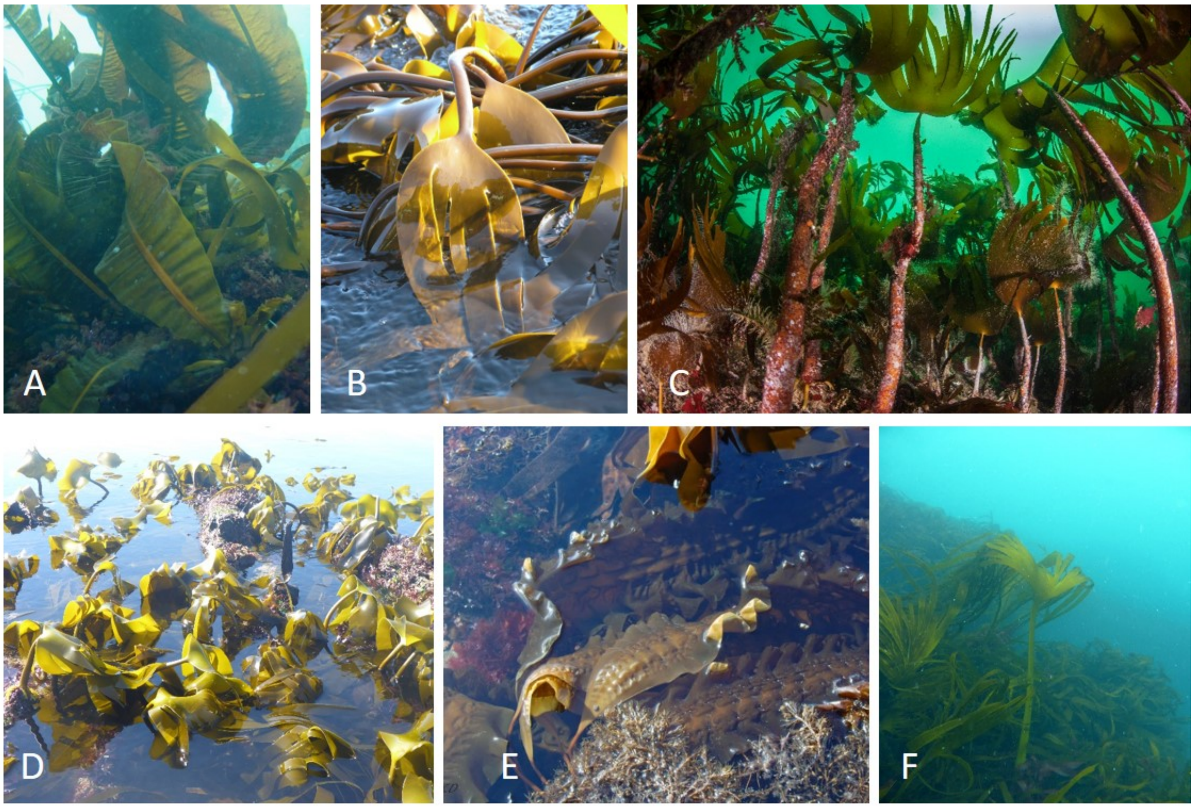


Figure 1. North-East Atlantic kelp forests dominated by the following species: A. *Alaria esculenta* (© MNHN Concarneau - R. Derrien), **B.** *Laminaria digitata* (© AWI Helmholtz Center for Polar and Marine Research - M. Molis), **C.** *L. hyperborea* (© SNH), **D.** *L. ochroleuca* (© CIIMAR - J. Franco), **E.** *Saccharina latissima* (© MNHN Concarneau - R. Derrien) and **F**. *Saccorhiza polyschides* (© MNHN Concarneau - A. Le Gal).

Littoral chalk communities

EUNIS Code: Various including A1.126, A1.2143, A1.441, B3.114 and B3.115

National Marine Habitat Classification for UK & Ireland code: Littoral chalk biotopes (various including LR.HLR.FR.Osm, LR.MLR.BF.Fser.Pid, LR.FLR.CvOv.ChrHap, LR.FLR.Lic.Bli and LR.FLR.Lic.UloUro)

The erosion of chalk exposures on the coast has resulted in the formation of vertical cliffs and gently-sloping intertidal platforms with a range of micro-habitats of biological importance. Supralittoral and littoral fringe chalk cliffs and sea caves support various algal communities unique to this soft rock type. Orange, brownish or blackish gelatinous bands of algae, composed of an assemblage of Haptophyceae species such as *Apistonema* spp., *Pleurochrysis carterae* and the orange *Chrysotila lamellosa*, but other genera and species of Chrysophyceae, Haptophyceae and Prasinophyceae are likely to be present as well. The lower littoral fringe may be characterised by a dense mat of green algae *Enteromorpha* spp. and *Ulva lactuca*. Lower down the shore in the eulittoral the generally soft nature of the chalk results in the presence of a characteristic flora and fauna, notably 'rock-boring' invertebrates such as piddocks, overlain by mostly algal-dominated communities (fucoids and red algal turfs) (Gubbay, 2002). Such coastal exposures of chalk are rare in Europe, with those occurring on the southern and eastern coasts of England accounting for the greatest proportion (57%) (ICES, 2003). Elsewhere, this habitat occurs in France, Denmark and Germany.

Lophelia pertusa reefs

EUNIS Code: A5.631 and A6.611

National Marine Habitat Classification for UK & Ireland code: SS.SBR.Crl.Lop

Lophelia pertusa, a cold water, reef-forming coral, has a wide geographic distribution ranging from 55°S to 70°N, where water temperatures typically remain between 4-8°C. These reefs are generally subject to moderate current velocities (0.5 knots). The majority of records occur in the north-east Atlantic. The extent of *L. pertusa* reefs vary, with examples off Norway several km long and more than 20m high. These reefs occur within a depth range of 200->2000m on the continental slope, and in shallower waters in Norwegian fjords and Swedish west coast. In Norwegian waters, *L. pertusa* reefs occur on the shelf and shelf break off the western and northern parts on local elevations of the sea floor and on the edges of escarpments. The biological diversity of the reef community can be three times as high as the surrounding soft sediment (ICES, 2003), suggesting that these cold-water coral reefs may be biodiversity hotspots. Characteristic species include other hard corals, such as *Madrepora oculata* and *Solenosmilia variabilis*, the redfish *Sebastes viviparous* and the squat lobster *Munida sarsi*. *L. pertusa* reefs occur on hard substrata; this may be *Lophelia* rubble from an old colony or on glacial deposits. For this reason, *L. pertusa* reefs can be associated with iceberg plough-mark zones. Areas of dead coral reef indicate the site supported coral reef habitat in the past and should be reported as this habitat type.

Maerl beds

EUNIS Code: A5.51

National Marine Habitat Classification for UK & Ireland code : SS.SMp.Mrl

"Maerl" is a collective term for several species of calcified red seaweed (e.g. *Phymatolithon calcareum*, *Lithothamnion glaciale*, *Lithothamnion corallioides* and *Lithophyllum fasciculatum*) which live unattached on sediments. In favourable conditions, these species can form extensive beds, typically 30% cover or more, mostly in coarse clean sediments of gravels and clean sands or muddy mixed sediments, which occur either on the open coast or in tide-swept channels of marine inlets, where it grows as unattached nodules or 'rhodoliths'. Maerl beds have been recorded from a variety of depths, ranging from the lower shore to 30m depth. As maerl requires light to photosynthesize, depth is determined by water turbidity. In fully marine conditions the dominant species is typically *P. calcareum*, whilst under variable salinity conditions such as sealochs, beds of *L. glaciale* may develop. Maerl beds have been recorded off the southern and western coasts of the British Isles, north to Shetland, in France and other western European waters.

Modiolus modiolus horse mussel beds

EUNIS Code: A5.621, A5.622, A5.623 and A5.624

National Marine Habitat Classification for UK & Ireland code: SS.SBR.SMus.ModT, SS.SBR.SMus.ModMx, SS.SBR.SMus.ModHAs and SS.SBR.SMus.ModCvar

The horse mussel *Modiolus modiolus* forms dense beds, at depths up to 70m (but may extend onto the lower shore), mostly in fully saline conditions and often in tide-swept areas. Although *M. modiolus* is a widespread and common species, horse mussel beds (with typically 30% cover or more) are more limited in their distribution. *Modiolus* beds are found on a range of substrata, from cobbles through to muddy gravels and sands, where they tend to have a stabilising effect, due to the production of byssal threads. Communities associated with *Modiolus* beds are diverse, with a wide range of epibiota and infauna being recorded, including hydroids, red seaweeds, solitary ascidians and bivalves such as *Aequipecten opercularis* and *Chlamys varia*. As *M. modiolus* is an Arctic-Boreal species, its distribution ranges from the seas around Scandinavia (including Skagerrak & Kattegat) and Iceland south to the Bay of Biscay.

Oceanic ridges with hydrothermal vents/fields

EUNIS code: A6.94

National Marine Habitat Classification for UK & Ireland code: Not defined

Hydrothermal vents occur along spreading ridges (such as the mid-Atlantic ridge), subduction zones, fracture zones and back-arc basins (Gage & Tyler, 1991), and are caused by seawater penetrating the upper levels of the Earth's crust through channels formed in cooling lava flows, reacting chemically with hot basalt in the Earth's crust and then rising back to the sea-bed to vent as superheated water containing compounds such as sulphides, metals, CO_2 and methane (Tunnicliffe *et al*, 1998 in Gubbay, 2002). The water may trickle out from cracks and crevices on the seabed as hot springs (5-250°C), or as very concentrated jets of superheated water (270-380°C). As these concentrated jets of water cool, minerals dissolved in the water precipitate out in black clouds, giving them their common name of 'black smokers'. At lower temperatures, sulphides are mostly precipitated within the rocks, making the venting fluids appear cloudier. These are known as 'white smokers' (Gage & Tyler, 1991). Hydrothermal vent fields cover relatively small areas of the seabed in water depths of 850-4,000m. The biological communities associated with hydrothermal vents are unusual as they are able to derive energy under conditions where photosynthesis is not possible. These habitats contain a huge diversity of chemoautotrophic bacteria, which form the core of the trophic structure around the vent. Characteristic species include the mussel *Bathymodiolus azoricus* and its commensal worm *Branchipolynoe seepensis*, the shrimps *Mirocaris fortunata*, *Chorocaris chacei* and *Rimicaris exoculata* (this last one is dominant on the southern vent fields of Lucky Strike), the crab *Segonzacia mesatlantic*, the polychaete *Amathys lutzi*, the amphipod *Luckia strike* and the limpet *Lepetodrilus atlanticus*.

Ostrea edulis beds

EUNIS Code: A5.435

National Marine Habitat Classification for UK & Ireland code: SS.SMx.IMx.Ost

Beds of the oyster *Ostrea edulis* occurring at densities of 5 or more per m^2 on shallow mostly sheltered sediments (typically 0-10m depth, but occasionally down to 30m). There may be considerable quantities of dead oyster shell making up a substantial portion of the substratum. The clumps of dead shells and oysters can support large numbers of the ascidians *Ascidiella aspersa* and *Ascidiella scabra*. Several conspicuously large polychaetes, such as *Chaetopterus variopedatus* and terebellids, may be present as well as additional suspension-feeding polychaetes such as *Myxicola infundibulum*, *Sabella pavonina* and *Lanice conchilega*. A turf of seaweeds such as *Plocamium cartilagineum*, *Nitophyllum punctatum* and *Spyridia filamentosa* may also be present (Connor *et al*, 2004).

Sabellaria spinulosa reefs

EUNIS Code: A4.22 and A5.611

National Marine Habitat Classification for UK & Ireland code: SS.SBR.PoR.SspiMx and CR.MCR.CSab

Two sub-types: *Sabellaria spinulosa* reefs on rock

Sabellaria spinulosa reefs on mixed (sediment) substrata

The tube-building polychaete *Sabellaria spinulosa* can form dense aggregations on mixed substrata and on rocky habitats. In mixed substrata habitats, comprised variously of sand, gravel, pebble and cobble, the *Sabellaria* covers 30% or more of the substrata and needs to be sufficiently thick and persistent to support an associated epibiota community which is distinct from surrounding habitats. On rocky habitats of bedrock, boulder and cobble, the *Sabellaria* covers 50% or more of the rock and may form a crust or be thicker in structure. In some areas, these two variations of reef type may grade into each other. *Sabellaria* reefs have been recorded in depths between 10-50m BCD or more. The reef infauna typically comprises polychaete species such as *Protodorvillea kefersteini*, *Scoloplos armiger*, *Harmothoe* spp., *Mediomastus fragilis*, *Lanice conchilega* and cirratulids together with the bivalves *Abra alba* and *Nucula* spp. and tube-building amphipods such as *Ampelisca* spp. Epifauna comprise calcareous tubeworms, pycnogonids, hermit crabs, amphipods, hydroids, bryozoans, sponges and ascidians. *S. spinulosa* reefs are often found in areas with quite high levels of natural sediment disturbance; in some areas of reef, individual clumps of *Sabellaria* may periodically break down and rebuild following storm events. *S. spinulosa* reefs have been recorded from all European coasts except the Baltic Sea, Skagerrak and Kattegat. Areas of dead *Sabellaria* reef indicate the site supported reef habitat in the past and should be reported as this habitat type.

Seamounts

EUNIS Code: A6.72

National Marine Habitat Classification for UK & Ireland code: Not defined

Seamounts are defined as undersea mountains, with a crest that rises more than 1,000 metres above the surrounding sea floor (Menard, 1964 in Rogers, 1994). Seamounts can be a variety of shapes, but are generally conical with a circular, elliptical or more elongate base. Seamounts are volcanic in origin, and are often associated with seafloor 'hot-spots' (thinner areas of the earth's crust where magma can escape). Seamounts, often with a slope inclination of up to 60°, provide a striking contrast to the surrounding 'flat' abyssal plain. Their relief has profound effects on the surrounding oceanic circulation, with the formation of trapped waves, jets, eddies and closed circulations known as Taylor columns (Taylor, 1917 in Rogers, 1994). Seamounts occur frequently within the OSPAR Maritime Area. Analysis of narrow beam bathymetric data by the US Naval Oceanographic office from 1967-1989 identified more than 810 seamounts within the North Atlantic. The majority occur along the Mid-Atlantic ridge between Iceland and the Hayes fracture zone (Gubbay, 2002).

The enhanced currents that occur around seamounts provide ideal conditions for suspension feeders. Gorgonian, scleratinian and antipatharian corals may be particularly abundant, and other suspension feeders such as sponges, hydroids and ascidians are also present. Concentrations of commercially important fish species, such as orange roughy, aggregate around seamounts and live in close association with the benthic communities (Gubbay, 2002).

Seapens and burrowing megafauna communities

EUNIS Code: A5.361 and A5.362

National Marine Habitat Classification for UK & Ireland code: SS.SMu.CFiMu.SpnMeg and SS.SMu.CFiMu.MegMax

Plains of fine mud, at water depths ranging from 15-200m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface. The habitat may include conspicuous populations of seapens, typically *Virgularia mirabilis* and *Pennatula phosphorea*. The burrowing crustaceans present may include *Nephrops norvegicus*, *Calocaris macandreae* or *Callianassa subterranea*. In the deeper fiordic lochs which are protected by an entrance sill, the tall seapen *Funiculina quadrangularis* may also be present. The burrowing activity of megafauna creates a complex habitat, providing deep oxygen penetration. This habitat occurs extensively in sheltered basins of fjords, sea lochs, voes and in deeper offshore waters such as the North Sea and Irish Sea basins.

Zostera beds

EUNIS Code: A2.611, A5.533 and A5.545

National Marine Habitat Classification for UK & Ireland code: LS.LMP.LSgr and SS.SMP.SSgr

Two sub-types : 8.1 *Zostera marina* beds

8.2 *Zostera noltii* beds

i. ***Zostera marina***

Zostera marina forms dense beds, with trailing leaves up to 1m long, in sheltered bays and lagoons from the lower shore to about 4m depth, typically on sand and sandy mud (occasionally with an admixture of gravel). Where their geographical range overlaps, such as the Solent in the UK, *Z. marina* passes upshore to *Z. noltii*.

ii. ***Zostera noltii***

Z. noltii forms dense beds, with leaves up to 20cm long, typically in the intertidal region (although it can occur in the very shallow subtidal), on mud/sand mixtures of varying consistency.

To qualify as a *Zostera* 'bed', plant densities should provide at least 5% cover (although when *Zostera* densities are this low, expert judgement should be sought to define the bed). More typically, however, *Zostera* plant densities provide greater than 30% cover. Seagrass beds stabilise the substratum as well as providing a habitat for many other species. As well as an important source of organic matter, seagrass beds may also provide an important nursery habitat for juvenile fish (ICES, 2003).

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