

# North-East Atlantic Region

## Contents Page

<b>1</b>	<b>About .....</b>	<b>3</b>
<b>1.1</b>	<b>Overview.....</b>	<b>3</b>
<b>1.2</b>	<b>Key Dates.....</b>	<b>4</b>
<b>1.3</b>	<b>Geographic and General Information.....</b>	<b>4</b>
1.3.1	Oceanographic Information .....	4
1.3.2	Coastal Geography and Geology.....	5
1.3.3	Ecosystem Diversity.....	6
1.3.3.1	Open Ocean.....	6
1.3.3.2	Beaches, Estuaries, Fjords and Rias .....	6
1.3.3.3	Intertidal Mud and Sandflats .....	6
1.3.3.4	Wetlands.....	7
1.3.3.5	Seagrass Beds.....	7
1.3.3.6	Maerl Beds.....	7
1.3.3.7	Kelp Forest .....	7
1.3.4	Species Diversity.....	7
1.3.4.1	Phytoplankton .....	7
1.3.4.2	Zooplankton.....	8
1.3.4.3	Benthos.....	8
1.3.4.4	Fish.....	9
1.3.4.5	Birds.....	9
1.3.4.6	Cetaceans .....	10
1.3.4.7	Seals .....	10
1.3.4.8	Turtles.....	10
1.3.5	Information on Participating States .....	11
1.3.5.1	Belgium.....	11
1.3.5.2	Denmark.....	11
1.3.5.3	Finland.....	11
1.3.5.4	Germany .....	12
1.3.5.5	France.....	12
1.3.5.6	Iceland .....	12
1.3.5.7	Ireland.....	13
1.3.5.8	Luxemburg.....	13
1.3.5.9	Netherlands .....	13
1.3.5.10	Norway.....	13
1.3.5.11	Portugal .....	14
1.3.5.12	Spain.....	14
1.3.5.13	Sweden .....	15
1.3.5.14	Switzerland .....	15
1.3.5.15	United Kingdom.....	15
<b>1.4</b>	<b>Organization .....</b>	<b>17</b>

1.4.1	Institutional Structure.....	17
1.4.2	Ministerial Meetings .....	18
1.4.3	Coordinating Unit .....	18
1.4.4	Committees.....	18
<b>1.5</b>	<b><i>Partners/Observers .....</i></b>	<b>19</b>
<b>2</b>	<b>Our Work .....</b>	<b>19</b>
<b>2.1</b>	<b><i>Programme Strategy .....</i></b>	<b>19</b>
<b>2.2</b>	<b><i>Action Plan.....</i></b>	<b>19</b>
2.2.1	Strategies.....	20
<b>2.3</b>	<b><i>Convention.....</i></b>	<b>21</b>
2.3.1	Annexes .....	22
<b>2.4</b>	<b><i>Issues and Threats .....</i></b>	<b>23</b>
2.4.1	Habitat and Species Loss.....	23
2.4.2	Land Based Sources of Pollution .....	23
2.4.3	Sea Based Pollution .....	24
2.4.4	Exploitation of Resources .....	25
2.4.5	Sand and Gravel Extraction .....	26
2.4.6	Alien Species.....	26
2.4.7	Tourism.....	26
2.4.8	Climate Change and Sea Level Rise .....	26
<b>2.5</b>	<b><i>Current Activities.....</i></b>	<b>27</b>
<b>3</b>	<b>Publications .....</b>	<b>29</b>
<b>3.1</b>	<b><i>Regional Seas Reports and Studies.....</i></b>	<b>29</b>
<b>3.2</b>	<b><i>Meeting Reports .....</i></b>	<b>29</b>
<b>3.3</b>	<b><i>Website Links .....</i></b>	<b>29</b>
<b>4</b>	<b>References .....</b>	<b>29</b>

# 1 About

## 1.1 Overview

The North-East Atlantic region stretches from the coast of Greenland eastward to the North Sea, and from the North Pole southward to the Straits of Gibraltar. With habitats ranging from tidal mud flats to steep cliffs, shallow estuaries, deep seabed, kelp forests, seagrass beds to deep coldwater coral reefs, the region is rich in marine life. The East Atlantic Flyway is also a migratory route for millions of birds using the coastal and wetland areas for feeding and nesting. However, the delicate marine and coastal ecosystems of the North-East Atlantic are under threat due to; pollution from land based sources, shipping and offshore installations; and overexploitation of resources including overfishing, aggregate extraction and coastal development.

Environmental concerns arose and began to take hold in 1967 with the Torrey Canyon oil spill accident having disastrous environmental effects. International cooperation began with the Oslo Convention, adopted in 1972 to prevent the dumping of hazardous substances at sea, and was soon followed by the 1974 Paris Convention dealing with land-based sources of pollution. These legal instruments have now merged and modernized into the present day Convention for the Protection of the Marine Environment of the North-East Atlantic of 1992 (OSPAR Convention), which entered into force in 1998.

The new OSPAR Convention is based on the following main principles: the 'precautionary principle'; the 'polluter pays principle'; the Best Available Techniques (BAT); and the Best Environmental Practice (BEP). The Annexes to the Convention deal with the prevention and elimination of pollution from land-based sources, by dumping or incineration and from offshore sources; and with assessment of the quality of the marine environment. The most recent Annex on the Protection and Conservation of Ecosystems and Biological Diversity of the Maritime Area has now entered into force.

The Convention's implementing body, the OSPAR Commission, brings together 15 countries (Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom), the European Union, and observers from 27 non-governmental organizations, representing both environmental groups and industry.

In addition to the Convention, the OSPAR Commission agreed on five long-term strategies: the protection and conservation of ecosystems and biological diversity; the cessation of discharges of hazardous substances; progressive and substantial reductions in discharges of radioactive substances; combating eutrophication; and controlling offshore activities. These strategies will be the focus of OSPAR's work over the next decade, during which time the Commission will track their implementation through a Joint Assessment and Monitoring Programme (JAMP).

## 1.2 Key Dates

1969	Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil (Bonn Agreement).
1974	Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention) entered into force in 1974.
1978	Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris Convention) entered into force in 1978.
1992	A meeting of the Oslo and Paris Commissions at Ministerial level was held in Paris on 21-22 September 1992. The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) adopted 21-22 September 1992.
1998	The OSPAR Convention entered into force on 25 March 1998. The Ministerial meeting of the OSPAR Commission was held in conjunction with the annual meeting of the Commission on 22-23 July 1998, in Sintra, Portugal.
2003	Ministerial Meeting of the OSPAR Commission, Bremen, Germany 25 June. Joint HELCOM/OSPAR Ministerial Meeting on 25-26 June, Bremen.

## 1.3 Geographic and General Information

**Region:** North-East Atlantic

**Participating States:** (16) Belgium, Denmark, European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom (UNEP 2001)

**Total Population:** Approximately 314.8 million in 2002

**Area:** 13.5 x 10<sup>6</sup> km<sup>2</sup> (OSPAR Commission 2000)

**GIWA Regions:** Subregion 18: North Sea, Subregion 19: Celtic-Biscay Shelf, Subregion 20: Iberian Coastal, Subregion 12: Norwegian Sea, Subregion 13: Faroe Plateau and Subregion 14: Iceland Shelf

**Large Marine Ecosystems:** LME #22: North Sea, LME #24: Celtic-Biscay Shelf, LME #60: Faroe Plateau, LME #59: Iceland Shelf, LME #25: Iberian Coastal and LME #21: Norwegian Shelf

### 1.3.1 Oceanographic Information

Current patterns in the region are strongly influenced by the North Atlantic Drift that has its origins on the western side of the Atlantic as the Gulf Stream. This warmer water influences currents and water temperatures along the Atlantic coasts of the realm and, to a lesser extent, the residual currents in the North Sea and Irish Sea (Gubbay 1995).

In the North Sea the pattern of current movement of surface waters is in an anticlockwise direction with the general direction of flow down the east coast of Scotland and England, along the coasts of mainland Europe, and up the western seaboard of Sweden and the coast of Norway. There is also a movement of Atlantic water at depth toward the coast of Norway. In the Irish Sea, surface water flow is generally from south to north on the western side of the Isle of Man and in a circular motion within Liverpool Bay. Surface waters move up the English Channel from west to east and into the North Sea. Shelf-sea fronts form in the region

on a regular basis in the transitional zones between stratified and mixed waters (Gubbay 1995).

Most areas of the OSPAR region are vertically well mixed in the winter months of the year, down to a depth of more than 600 m in the eastern Atlantic. In spring, however, the waters become stratified, as solar heat input increases, a thermocline<sup>1</sup> is established over much of the region, separating a heated and less dense surface layer from the rest of the water column. In the shallow shelf areas with strong tidal movements, the waters remain mixed throughout the year. The distinction into stratified and permanently tidally mixed areas is of considerable importance to the structuring of both pelagic and benthic ecosystems. Where the thermocline outcrops at the surface, the boundary between the different water masses is known as a tidal front and is a region of intense biological activity. In oceanic waters to the south of the OSPAR area, there is a deep, permanent thermocline (OSPAR Commission 2000).

Parts of the region are notable for their tidal range, for example the Severn Estuary has the second largest tidal range in the world (12m) and coastal areas around Jersey, one of the Channel Islands, experience the third largest tidal range in the world (Gubbay 1995).

### 1.3.2 Coastal Geography and Geology

The North Atlantic began to form approximately 200 million years ago as the European and North American plates separated either side of the active mid-ocean ridge. The current rate of spreading due to formation of basaltic oceanic crust at the mid-ocean ridge is approximately 2 cm/yr. The OSPAR area can be divided into three distinct geological regimes: the oceanic basin and the continental shelf, separated at the shelf break by the passive continental margin. In the deep ocean basin an abyssal plain extends either side of the Mid-Atlantic Ridge to the continental margins consisting of a 4–6 km thick basaltic basement overlain by 0.1–2 km thick accumulations of sediment (pelagic oozes<sup>2</sup>). At the continental margins huge wedges of sandy to muddy sediments extend down into the deep-sea basin. The continental crust is generally 30–40 km thick, thinning below the sedimentary basins. It has a varied composition of igneous, metamorphic and sedimentary rocks as a result of a succession of separate tectonic periods. Underlying the whole NW European Shelf is the Pre-Cambrian basement (> 600 million yr). Oil is found in the Jurassic sediments of the central North Sea graben and in fractured Tertiary strata of the Faroe-Shetland Basin (OSPAR Commission 2000).

The major topographical features in the OSPAR maritime area are the Mid-Atlantic Ridge. Water depths range from around 5000 m on either side of the Mid-Atlantic Ridge, to less than 200 m on the continental shelf along the European coast. In some places seamounts occur as submerged mountains along the ocean floor. The most extensive continental shelf areas are found in the North Sea and Celtic Seas. Other shelf seas are found around Iceland, Greenland and in the Barents Sea. In contrast, along the Iberian coast and to the west of Norway, the shelf break is quite close to the coastline (OSPAR Commission 2000).

The total catchment of the Convention area covers approximately 5,140,000 km<sup>2</sup> and is made up of: the northern Norwegian coast, the Fennoscandian and Kola peninsulas and Arctic islands, Iceland, Greenland and the Russian rivers Pechora and Dvina; catchments draining directly into the North Sea and, indirectly, through the Baltic outflow from a large Baltic catchment; the western part of the United Kingdom and Ireland; the Franco-Iberian area; and the Azores (OSPAR Commission 2000).

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<sup>1</sup> Thermocline is a pronounced vertical temperature gradient

<sup>2</sup> Pelagic oozes consists largely of the remains of microscopic organisms (mostly foraminifera and diatoms) from the overlying waters, as well as minor amounts of windblown atmospheric dust and turbidity currents.

### **1.3.3 Ecosystem Diversity**

#### **1.3.3.1 Open Ocean**

The major topographical features in the OSPAR maritime area are the Mid-Atlantic Ridge and the Greenland-Scotland Ridge (which separates the Atlantic Basin from the Nordic Seas). In some places seamounts occur as submerged single mountains or chains of mountains along the ocean floor (OSPAR Commission 2000). There are many island groups in the region including the volcanic islands of Madeira, the Azores, the Channel Islands, the low-lying archipelago of the Isles of Scilly off southwestern Britain and the numerous islands off the western and northeastern coast of Scotland (Gubbay 1995). In the north west region the seabed drops to more than 1 km in the Rockall Trough. Other significant deep sea areas include the Porcupine Bank and the Iberian Abyssal Plan in the southwestern part of the region (Gubbay 1995).

#### **1.3.3.2 Beaches, Estuaries, Fjords and Rias**

A diverse mixture of coastal landscapes is found in the OSPAR area, although generally the western margins are deeply indented with fjords (Norway in particular), estuaries and rias (south-west Ireland and north-western Spanish). In northern latitudes, the coastline is dominated by high mountains. Around the North Sea and Celtic Sea, the coastline exhibits a range of features, including cliffs of varying heights and rock types, bays and estuaries, sandy and shingle beaches, dunes and island archipelagos. Further south, on the Bay of Biscay there are low-lying lagoons. The Iberian coast comprises alternating cliffs and beaches, while cliffs predominate on the oceanic islands such as the Azores, Iceland and the Faroe Islands (OSPAR Commission 2000). A predominantly soft coastline of sand dunes, saltmarsh and mudflats borders the western shores of Denmark, Germany, and the Netherlands. Denmark has some of the most active dune landscapes in Europe, standing up to 30 m high. The western coasts of Scotland and Ireland provide a contrast with their mostly rocky, indented, coastlines of sea lochs and rias. The islands of St. Kilda off the west coast of Scotland are faced by the highest sea cliffs in Europe, more than 300 m high and continuing vertically underwater for more than 50 m (Gubbay 1995). The northern coast of France is dominated by rocky shores but further south there are extensive sandy areas and dramatic coastal dunes. The coastline of Portugal is also important for dunes and beaches but also has a number of sheltered inlets and lagoons. One of the most striking coastal features in the southern part of the region is the Guadalquivir delta in southern Spain, one of the largest wetlands in Europe (Gubbay 1995).

#### **1.3.3.3 Intertidal Mud and Sandflats**

Intertidal Mud and Sandflats are found throughout the region. They are present in each of the biogeographic zones but particularly widespread in the boreal region. The Wadden Sea has the largest stretch of uninterrupted mudflats in the world and are of international importance for wildlife. The extremely productive, but species poor, tidal flats support vast numbers of waders and wildfowl: around 10 million birds pass through the region each year, and they are also an important nursery ground for North Sea fish stocks. Intertidal flats around the British Isles are less extensive but critically important for many species because the mild winter conditions and good tidal range exposes large areas of flats allowing access to food for waders and wildfowl during the winter months. Many of these intertidal flats are in estuarine situations and the Wadden Sea and Great Britain together account for more than 65 % of the estuarine habitat of the region. Further south intertidal flats are less extensive but important in certain localities such as the Loire and Gironde estuaries in France, the Tejo in Portugal and the Guadalquivir delta in southern Spain (Gubbay 1995).

#### **1.3.3.4 Wetlands**

There are numerous areas within the Oskar regio that are listed as Ramsar sites. Refer to the Ramsar List of Wetlands of International Importance (2004) [www.ramsar.org](http://www.ramsar.org)

#### **1.3.3.5 Seagrass Beds**

Seagrass beds are found throughout the region where conditions are suitable. They are most widespread in the Boreal, Boreal-Lusitanian and Lusitanian-Boreal regions. Extensive areas of eel grass, *Zostera marina* can be found in the eastern part of the Wadden Sea but it also grows in many sheltered sites around the U.K. and Ireland, the Channel coast and parts of the Atlantic coast of France (Gubbay 1995). The World Atlas of Seagrasses shows the distribution of seagrasses in the OSPAR region. Link to: <http://www.unep-wcmc.org/marine/seagrassatlas/>.

#### **1.3.3.6 Maerl Beds**

Several species of calcified red seaweed occur in the region and a number of these form maerl beds. *Lithothamnium glaciale* is at its southern limit in the realm while *Phymatolithon calcareum* and *Lithothamnium corallioides* are at their northern limit. There are particularly extensive beds of maerl off the coast of Brittany and in parts of southwestern Ireland. Small patches of maerl are also widespread in some of the Scottish sea lochs and there is a large bed in the Fal estuary in southern Britain. Maerl beds support a rich assemblage of both plants and animals and the crevices between the twigs provide shelter for many species. Beds that are no longer living support communities similar to those found on fine shell gravel (Gubbay 1995).

#### **1.3.3.7 Kelp Forest**

Kelp forests are widespread on rocky sublittoral<sup>3</sup> areas in the northern part of the region. Several species grow densely to form great kelp forests. *Laminaria hyperborea* and *L. digitata* are widespread around the U.K., Ireland and France but the larger, more open growing *L. ochreluca* is also present from the Channel southward. This community is a feature of infralittoral<sup>4</sup> rocky areas in much of the Boreal, Boreal-Lusitanian and Lusitanian-Boreal zones. Kelp forests harbor many species of flora and fauna that find shelter, food and surfaces for attachment on the kelp and the surrounding rocky substrate (Gubbay 1995).

### **1.3.4 Species Diversity**

#### **1.3.4.1 Phytoplankton**

Phytoplankton biomass shows considerable spatial variability within the OSPAR area. The seasonal cycle is typical of temperate latitudes with a spring increase, summer decline and a second, generally smaller, autumn increase. The spring bloom is generated mainly by diatoms which decline as concentrations of the winter accumulated nutrients (e.g. silica and nitrate) are utilised and as grazing pressure from zooplankton increases. In ice-covered waters in the Arctic the seasonal cycle has a pronounced peak as the developing bloom moves north with the retreating ice edge. South of 40° N, in the wider Atlantic, the upper

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<sup>3</sup> Sublittoral is the sea-shore zone lying immediately below the littoral (inter-tidal) zone and extending to a depth of about 200 m or the edge of the continental shelf.

<sup>4</sup> Infralittoral is the lower zone of the intertidal zone that is exposed to air only during the very lowest spring tides.

water column stays stratified throughout the year so the biomass is lower and less variable throughout the seasons. The timing of the spring bloom is closely linked with the developing water stratification, which allows phytoplankton cells to remain in the higher light levels of the upper water column. After the spring bloom, nutrients become limiting above the thermocline. As a result, phytoplankton production is reduced in the summer. During summer months recycling of nutrients occurs and other algal groups such as the dinoflagellates dominate the phytoplankton community. Diatoms return again in the late autumn as stratification breaks down and nutrients are again mixed into surface water (OSPAR Commission 2000).

#### **1.3.4.2 Zooplankton**

The growth of zooplankton is governed by temperature and food availability so that their seasonal cycle is linked to that of the phytoplankton. Some species such as *Calanus finmarchicus* hibernate during winter in deep water timing their arrival in near surface waters to exploit the phytoplankton spring bloom. The herbivorous copepods of the genus *Calanus* play a key role in ecosystems of the OSPAR area. They are the most abundant form of zooplankton and may account for over 90% dry weight of the total zooplankton biomass in the northern and eastern part of the area (OSPAR Commission 2000).

Zooplankton are the main source of food for pelagic fish and the early life stages of all fish. There are strong yearly variations in zooplankton abundance (e.g. *C. finmarchicus* and *C. helgolandicus* abundance varies in the Irish Sea). The zooplankton biomass and composition in the central and northern Barents Sea have also shown several fold variations between years, which in part appears to be caused by fish predation. Elsewhere, as for phytoplankton, longer-term changes for many species appear to be related to variability in ocean-atmosphere circulation (OSPAR Commission 2000).

#### **1.3.4.3 Benthos**

The benthic communities present in the OSPAR region are determined largely by the sediment type and water depths. As much of the sediments and water depths are uniform over large expanses of this region (especially within the North Sea), broad benthic community types are also widespread and fairly uniform. The Greenland–Scotland Ridge is a major biogeographical boundary for benthos. This ridge forms a barrier between warm and cold water species. In the north and north-western limits of the OSPAR region the Arctic deep-sea province the benthic community prevails. To the south benthic communities are described as being ‘Boreal’ in nature, and the many studies undertaken have divided this region into broad scale community types based upon these areas of similar sediment types and water depths. Regions of relatively deep waters (e.g. northern North Sea) where sediments are less mobile many sessile organisms exist such as tube worms, soft corals, sea pens, molluscs, sponges and bryozoans. Large swathes of the central North Sea are associated with medium depth unconsolidated sandy sediments, which support an intermediate community between those found in deeper waters and those in shallower waters. In the southern North Sea the sediments are largely sandy and associated with shallow waters. Here more mobile benthic communities exist, and are dominated by scavenging and predatory organisms such as starfish, urchins, polychaetes, and amphipods (OSPAR Commission 2000, DTI 2003, DTI 2001).

Regions of mixed sediment types (where a larger range of habitat types exist), areas of hard ground (which allow a more complex community to develop), and regions where oceanographic fronts exist (which promote high productivity) tend to support more diverse benthic communities. Notable regions being off the north of Scotland and western Norway in deep ridges where complex communities exist and include the unique cold water coral and the areas of *Sabellaria spinulosa* reef in the southern North Sea and Irish Sea where mixed substrates occur. Other biogenic reefs such as those created by dense aggregations of the Horse mussel *Modiolus modiolus*, and those formed of loose-lying coralline algae called

maerl are present in patchy occurrence in OSPAR region. Frontal zones such as those in the Denmark Strait, between Iceland and the Faroe Islands, in the western part of the Barents Sea have high levels of primary production and consequently support a diverse benthic community, and areas of high tidal activity (such as the Wadden Sea along the south-eastern border of the North Sea, and in several estuaries along the western European coast (OSPAR Commission 2000) also support high productivity and associated diverse benthic communities with the bivalve *Thyasira flexuosa* and the brittle starfish and *A. chiajei* (DTI 2001).

#### **1.3.4.4 Fish**

Over a thousand species of fish have been recorded in the OSPAR area. Of these, about 5% can be commercially exploited and about 2% of species make up 95% of the total fish biomass. Approximately 160 species of fish have been recorded in the Barents Sea. The number of fish species is comparatively low in the shallow southern North Sea and eastern Channel and increases towards the Celtic Sea and Bay of Biscay. Overall, around 250 species have been found in the North Sea, with more species occurring commonly than in the northern Norwegian coast, the Fennoscandian and Kola peninsulas and Arctic islands, Iceland, Greenland and the Russian rivers Pechora and Dvina. In the Bay of Biscay and the western part of the United Kingdom and Ireland, the number of species reaches 700. Along the Iberian coast in the Franco-Iberian area, the number of species remains high, as more demersal species of southern or Mediterranean distribution occur (OSPAR Commission 2000).

Many deep-water species have an extensive geographical distribution owing to the small environmental variations of their habitat. In the Wider Atlantic, top predators such as sharks probably play an important role in maintaining the structure and diversity of fish assemblages. Large pelagic predators (tuna and marlin) are highly migratory, ranging far beyond the boundaries of the OSPAR region (OSPAR Commission 2000).

Fish species that are of commercial importance include: the albacore tuna (*Thunnus alalunga*); bluefin (*Thunnus thynnus*); swordfish (*Xiphias gladius*); sardine (*Sardina pilchardus*), horse mackerel (*Trachurus trachurus*); mackerel (*Scomber scombrus*); anchovy (*Engraulis encrasicolus*); herring (*Clupea harengus*); cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), saithe (*Pollachius virens*); sandeel (*Ammodytes spp.*), Norway pout (*Trisopterus esmarki*), Plaice, Sole, Lemon Sole and Sprat (*Sprattus sprattus*) (OSPAR Commission 2000).

Shellfish species of commercial importance include: scallop (*Pecten maximus*); queen scallop (*Chlamys opercularis*); oysters; blue mussel (*Mytilus edulis*); cockle (*Cerastoderma edule*); edible crab (*Cancer pagurus*); whelk (*Buccinum undatum*); razor clams (*Ensis directus*); brown shrimp (*Crangon crangon*); Norway lobster (*Nephrops norvegicus*) and the lobster (*Homarus gammarus*) (OSPAR Commission 2000).

#### **1.3.4.5 Birds**

Almost all parts of the OSPAR area support breeding and migratory birds dependent on the sea. Proportionately, the greatest numbers of breeding seabirds nest on the coasts of Arctic waters and the North Sea. Total numbers of individuals in these northern areas are several orders of magnitude greater than those in the southern regions of the OSPAR area. Only the great skua (*Catharacta skua*) is endemic to the OSPAR area, although some species are near-endemic (e.g. Manx shearwater (*Puffinus puffinus*)) or have endemic sub-species (e.g. shag (*Phalacrocorax aristotelis*)) (OSPAR Commission 2000).

Large intertidal flats, such as in estuaries and in the Wadden Sea are particularly important for wading birds. Some 6–12 million birds of more than 50 different species may be present

in the Wadden Sea at some times of the year (OSPAR Commission 2000). Some important threatened species include; ferruginous duck (*Aythya nyroca*), the Spanish imperial eagle (*Aquila adalberti*) and the highly threatened slender-billed curlew (*Numenius tenuirostris*) and Audouin's gull (*Larus audouinii*) and pygmy cormorant (*Phalacrocorax pygmeus*). Many of these internationally important species concentrate at a small number of specific sites especially in the winter or on passage like the knot and bar-tailed godwit, or for breeding such as the greater flamingo. Important sites include the Wadden Sea coast, the estuarine habitats around the British Isles like the Severn estuary, and the Guadalquivir delta in southern Spain (Gubbay 1995).

The region also supports large populations of seabirds including fulmars, petrels, shearwaters, cormorants, shags, skuas, gulls, terns, auks, seaducks and divers. Many of these birds nest on offshore islands. The islands of St. Kilda, off the west coast of Scotland, for example support one of the largest concentrations of breeding seabirds in the North Atlantic with more than 400,000 pairs; the island of Grassholm, off the south Wales coast supports around 11 % of the North Atlantic population of breeding gannets. 10 million seabirds are present in the North Sea at most times of the year and they make up major percentages of the world population. For example the North Sea coasts supports more than 50 % of the biogeographic populations of common terns and great skuas and a further 12 species are present in more than 10 % of their population (Gubbay 1995).

#### **1.3.4.6 Cetaceans**

A variety of species can be seen in the region such as; the harbor porpoise, white-beaked dolphin, bottle-nosed dolphin common dolphin, long-finned pilot whale, Atlantic white-sided dolphin, Risso's dolphin, killer whale, minke whale, northern bottle nose whale, fin whale, striped dolphin and sperm whale (Gubbay 1995).

#### **1.3.4.7 Seals**

The vast majority of the seal population is found in the northern Norwegian coast, the Fennoscandian and Kola peninsulas and Arctic islands, Iceland, Greenland and the Russian rivers Pechora and Dvina. Approximately 40% of the world's population of grey seals breed in the waters around Europe. The number of pups has increased threefold over the past 30 years (OSPAR Commission 2000). Two species of seal are found in the northern part of the realm; the grey seal (*Halichoerus grypus*) and the common or harbor seal (*Phoca vitulina*). Grey seals tend to frequent the more wave-exposed, rocky sites while the common seal generally uses sheltered inshore areas. Grey seals congregate into large breeding colonies and there are major colonies in the Outer and Inner Hebrides and Shetland. The Sept Illes MPA off the coast of Brittany has one of only two breeding colonies of grey seal in France. The Wadden Sea coast is important for common seals that feed in the shallow waters and haul out on the extensive sandbanks. Other important sites for this species include the Wash on the east coast of England and Strangford Lough in Northern Ireland. In France the only common seal colony is around the Picards estuary. The Mediterranean monk seal is the another species, and the most endangered. One of the most important remaining locality for the Mediterranean monk seal is around the islands of Madeira (Gubbay 1995).

#### **1.3.4.8 Turtles**

The range of most sea turtles is in tropical or subtropical waters but some species undertake long migrations using the warm current of the Gulf Stream. For this reason, a few species visit the Bay of Biscay, the Iberian coast and the wider Atlantic every year. The one species that is frequently recorded in the OSPAR area is the loggerhead turtle (*Caretta caretta*) (OSPAR Commission 2000).

## 1.3.5 Information on Participating States

### 1.3.5.1 Belgium

**Total Population:** 10,333,000 (World Bank 2002)

**GDP (current US\$):** 245,394,600,000 (World Bank 2002)

**Maritime Claims:**

Territorial sea: 12 NM

Exclusive economic zone: 200 NM

Continental shelf: 200-m depth or to the depth of exploitation (CIA 2004)

**Length of Coastline:** 7,314 km (CIA 2004)

**Marine Protected Areas**

- Bornholm
- Adler Grund
- Smålandsfarvandet
- Waters around Saltholm
- Stavns Fjord
- Hesselö
- Store Middlegrund
- Randers Fjord
- Laesö
- Hirsholmene
- Laesö Trindel/Tønnerberg Banke/Kummelbanke
- Herthas Flak (Esping and Grönqvist 1995).

### 1.3.5.2 Denmark

**Total Population:** 5,374,000 (World Bank 2002)

**GDP (current US\$):** 172,927,900,000 (World Bank 2002)

**Maritime Claims:**

Territorial sea: 12 NM

Exclusive economic zone: 200 NM

Continental shelf: 200-m depth or to the depth of exploitation (CIA 2004)

**Length of Coastline:** 7,314 km (CIA 2004)

**Marine Protected Areas**

- Bornholm
- Adler Grund
- Smålandsfarvandet
- Waters around Saltholm
- Stavns Fjord
- Hesselö
- Store Middlegrund
- Randers Fjord
- Laesö
- Hirsholmene
- Laesö Trindel/Tønnerberg Banke/Kummelbanke
- Herthas Flak (Esping and Grönqvist 1995).

### 1.3.5.3 Finland

**Total Population:** 5,199,000 (World Bank 2002)

**GDP (current US\$):** 131,508,166,656 (World Bank 2002)

**Maritime Claims:**

Territorial sea: 12 NM

Exclusive economic zone: 200 NM

Continental shelf: 200-m depth or to the depth of exploitation (CIA 2004)

**Length of Coastline:** 2,389 km (CIA 2004)

### **Marine Protected Areas**

- Bothnian Bay National Park
- Outer Bothnian Threshold Archipelago
- Southern Archipelago Sea
- Tammisaari Archipelago/Hankoniemi/Pojo Bay
- Eastern Gulf of Finland

### **Proposed new MPAs:**

- Oura Archipelago
- Uusikaupunki Archipelago
- Åland Sea (Esping and Grönqvist 1995).

### **1.3.5.4 Germany**

**Total Population:** 82,495,000 (World Bank 2002)

**GDP (current US\$):** 1,984,094,928,896 (World Bank 2002)

#### **Maritime Claims:**

Territorial sea: 12 NM

Exclusive economic zone: 200 NM

Continental shelf: 200-m depth or to the depth of exploitation (CIA 2004)

**Length of Coastline:** 2,389 km (CIA 2004)

#### **Marine Protected Areas**

- Jasmund National Park
- Vorpommern Lagoon
- Wismar Bight/Salzhauff
- Graswarder/Westcoast of Fehmar
- Hochwater Bay
- Oehe Schleimunde
- Geltinger Birk

#### **Proposed new MPAs:**

- Strelasund Sound/Greifswald Lagoon/Isle Greifswalder (Esping and Grönqvist 1995).

### **1.3.5.5 France**

**Total Population:** 59,485,000 (World Bank 2002)

**GDP (current US\$):** 1,431,278,000,000 (World Bank 2002)

#### **Maritime Claims:**

territorial sea: 12 NM

continental shelf: 200-m depth or to the depth of exploitation

contiguous zone: 24 NM

exclusive economic zone: 200 NM (does not apply to the Mediterranean)(CIA 2004)

**Length of Coastline:** 3,427 km (CIA 2004)

#### **Marine Protected Areas**

- Archipel des Sept Iles
- Iroise
- Lilleau des Niges
- Moeze
- Pres Sales d'Ares Lege, Cap Ferret
- Banc d'Arguin (Gubbay 1995)

### **1.3.5.6 Iceland**

**Total Population:** 284,000 (World Bank 2002)

**GDP (current US\$):** 8,448,658,432 (World Bank 2002)

#### **Maritime Claims:**

territorial sea: 12 NM  
exclusive economic zone: 200 NM  
continental shelf: 200 NM or to the edge of the continental margin (CIA 2004)  
**Length of Coastline:** 4,988 km (CIA 2004)

#### 1.3.5.7 Ireland

**Total Population:** 3,920,000 (World Bank 2002)  
**GDP (current US\$):** 121,449,218,048 (World Bank 2002)

**Maritime Claims:**

territorial sea: 12 NM  
exclusive fishing zone: 200 NM (CIA 2004)  
**Length of Coastline:** 1,448 km (CIA 2004)

**Marine Protected Areas**

- Lough Hyne

**Proposed new MPAs:**

- Lambay Islands
- South Wexford coast
- Skellig Islands (Gubbay 1995)

#### 1.3.5.8 Luxemburg

**Total Population:** 444,000 (World Bank 2002)  
**GDP (current US\$):** 21,025,361,920 (World Bank 2002)  
**Maritime Claims:** none (landlocked) (CIA 2004)  
**Length of Coastline:** 0 km (landlocked) (CIA 2004)

#### 1.3.5.9 Netherlands

**Total Population:** 16,144,000 (World Bank 2002)  
**GDP (current US\$):** 417,909,768,192 (World Bank 2002)

**Maritime Claims:**

territorial sea: 12 NM  
exclusive fishing zone: 200 NM (CIA 2004)  
**Length of Coastline:** 451 km (CIA 2004)

**Marine Protected Areas:**

- The Dollard
- Milieuzone Noordzee
- Oosterschelde Buitendijks
- Waddenzee I and II

**Proposed new MPAs:**

- Klaverbank
- Sea area northwest of Frisian Islands (Gubbay 1995)

#### 1.3.5.10 Norway

**Total Population:** 4,538,000 (World Bank 2002)  
**GDP (current US\$):** 190,476,713,984 (World Bank 2002)

**Maritime Claims:**

territorial sea: 12 NM  
continental shelf: 200 NM  
contiguous zone: 10 NM  
exclusive economic zone: 200 NM (CIA 2004)

**Length of Coastline:** 21,925 km (includes mainland 3,419 km, large islands 2,413 km, long fjords, numerous small islands, and minor indentations 16,093 km) (CIA 2004)

**Marine Protected Areas:**

- Nötteröy Tjöme (Esping and Grönqvist 1995)

**1.3.5.11 Portugal**

**Total Population:** 10,177,000 (World Bank 2002)

**GDP (current US\$):** 121,594,609,664 (World Bank 2002)

**Maritime Claims:**

territorial sea: 12 NM

continental shelf: 200-m depth or to the depth of exploitation

contiguous zone: 24 NM

exclusive economic zone: 200 NM (CIA 2004)

**Length of Coastline:** 1,793 km (CIA 2004)

**Marine Protected Areas:**

- Berlenga
- Costa Vicentica e Sudoeste, Alentejano
- Bays of Maia, South Lourenco, Anjos and Praia around the island of Santa
- Vila Franca Islet, Sao Miguel Island
- Formigas Islets and Dolabarat Bank
- Topo Islet, Sao Jorge Island
- Lagoon of Santo Cristo, Sao Jorge Island
- Monte da Guia, Faial Island
- Selvagem Grande
- Selvagem Pequena and Ilheu de Fora
- Garajau
- Ilheu Chao and Deserta Grande
- Ilheu do Bugio

**Proposed new MPAs:**

- San Miguel-Caloura, Mosteiros Central group:
- Terceira-Ilheus das Cabras and Ilheus dos Fradinhos, Monte Brasil, Vila Nova-Ilheu Norte
- Graciosa-Ilheu da Praia, Baia do Carapacho-Ponta do Feliciano, Ponta Branca and Ilheu, Baia da Vitoria-Baia das Diagaves
- Sao Jorge-Faja dos Cuberes-Faja do Santo Cristo
- Pico-Ilheus da Madalena, Lages do Pico, north of the island
- Faial-Capelinhos, Morro de Castelo Branco, Baia do Porto Pim Western group:
- Flores-Ponta Ruiva-Santa Cruz, Ponta dos Bredo-Ponta da Rocha Alta, Ilheu da Gadelha
- Corvo (Gubbay 1995)

**1.3.5.12 Spain**

**Total Population:** 40,917,000 (World Bank 2002)

**GDP (current US\$):** 653,075,152,896 (World Bank 2002)

**Maritime Claims:**

territorial sea: 12 NM

contiguous zone: 24 NM

exclusive economic zone: 200 NM (applies only to the Atlantic Ocean) (CIA 2004)

**Length of Coastline:** 4,964 km (CIA 2004)

**Marine Protected Areas:**

- Donana
- Acantilado de Barbate (Gubbay 1995)

### 1.3.5.13 Sweden

**Total Population:** 8,924,000 (World Bank 2002)

**GDP (current US\$):** 240,312,729,600 (World Bank 2002)

**Maritime Claims:**

**Length of Coastline:**

Territorial sea: 12 NM

Exclusive economic zone: agreed boundaries or midlines

Continental shelf: 200-m depth or to the depth of exploitation (CIA 2004)

**Marine Protected Areas:** 3,218 km (CIA 2004)

- Haparanda Archipelago
- Holmö Islands
- Kopparstenarna/Gotska Sandön/Salvo Rev
- Falsterbo Peninsula with Måkläppen
- Kullaberg
- Gullmar Fjord

**Proposed new MPAs:**

- Bjuröklubb Area
- Trysunda/Ulvöarna/Ullånger/Ulvö Deep
- Gräsö/Singö-Archipelago
- St. Bockö/St. Nassa/Sv. Högarna/Sv. Björn
- Landsort/Hartsö/Askö/Landsort Deep
- St. Anna/Missjö Archipelago
- Torhamn Archipelago
- Nidingen/Sönnenbergen/Mönster
- Koster Archipelago/Koster Channel/Tjärnö Archipelago/Väderöarna (Esping and Grönqvist 1995).

### 1.3.5.14 Switzerland

**Total Population:** 7,290,000 (World Bank 2002)

**GDP (current US\$):** 267,445,141,504 (World Bank 2002)

### 1.3.5.15 United Kingdom

**Total Population:** 59,229,000 (World Bank 2002)

**GDP (current US\$):** 1,566,282,874,880 (World Bank 2002)

**Maritime Claims:** *territorial sea:* 12 NM

*exclusive fishing zone:* 200 NM

*continental shelf:* as defined in continental shelf orders or in accordance with agreed upon boundaries (CIA 2004)

**Length of Coastline:** 12,429 km (CIA 2004)

**Marine Protected Areas:**

- Lundy
- North Devon
- Helford River
- Wembury
- Purbeck
- Seven Sisters
- St. Abb's and Eyemouth
- Skomer and the Marloes Peninsula

**Important areas for marine wildlife**

- Holy Island and the Farnes
- Bolt Tail to Start Point
- Robin Hood's Bay and associated coast
- Plymouth Sound, Tamar and Yealm
- Flamborough Head

- Dodman Point to the Lizard
- The Wash and North Norfolk
- Isles of Scilly
- Orfordness
- St. Ives Bay
- Colne/Blackwater estuaries to Maplin Sands
- North Cornwall
- Thanet
- Lundy
- Seven Sisters
- North Devon
- Solent and Isle of Wight
- Severn Estuary
- Poole Bay and Isle of Purbeck
- Dee Estuary and North Wirral Coast
- Portland and the Fleet
- Morecambe Bay and Lune Deep
- Lyme Bay
- Cumbrian Coast
- Exe Estuary
- Solway
- Torbay to Start Point
- Loch Etive
- Loch Obe
- Loch Long
- Loch Eribol
- Loch Laxford
- Loch Torridon
- Loch Sween
- Loch Carron
- Loch Eynort
- Loch Sunart
- Loch Roag
- Loch Indaal
- Loch Ryan
- Loch Maddy
- Loch Duich
- Loch Seaforth
- Loch Creran
- Upper Loch Fyne
- Berwickshire
- Brindister Voe and Vadills
- Cumbraes
- Dunvegan Head
- Firth of Lorne
- Sound of Iona
- St.Kilda
- Swinster Voe and Houb of Fora Ness
- The Obbe
- The Houb, Fugla Ness

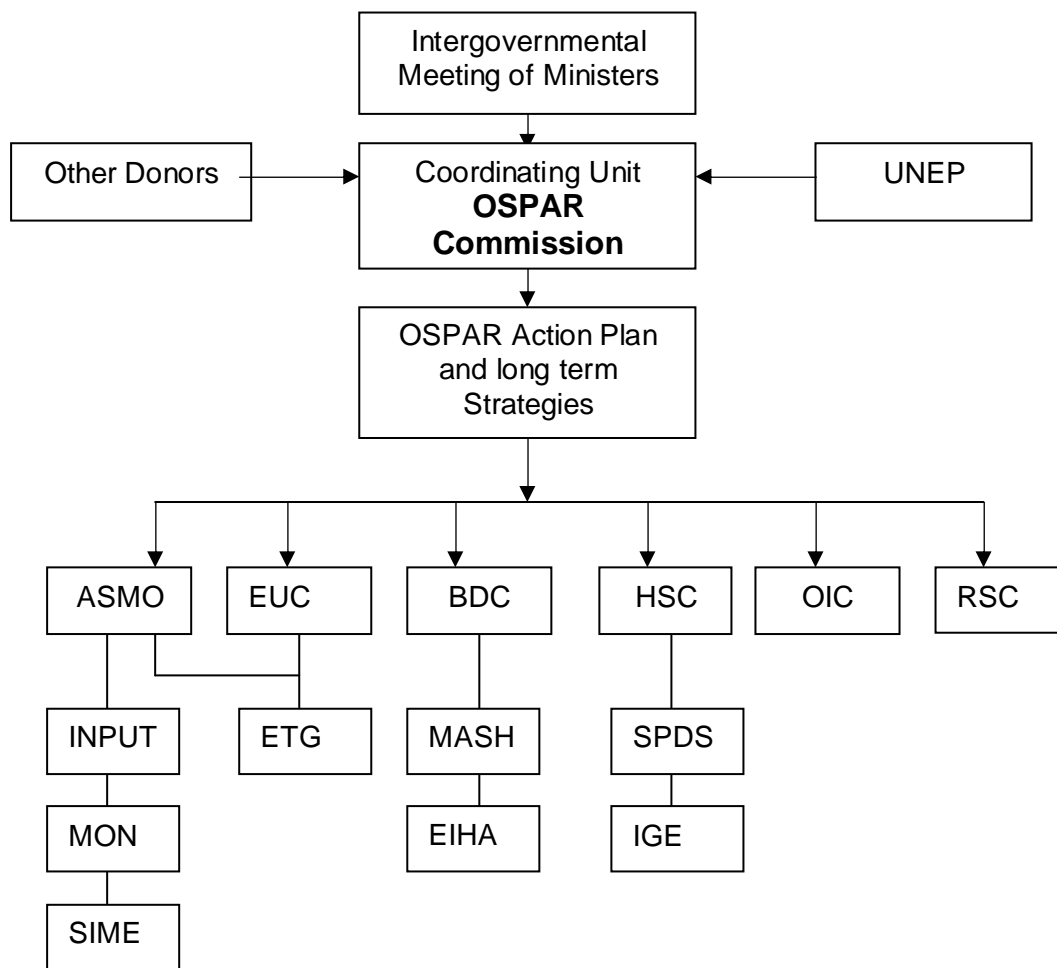
**Proposed new MPAs:**

- Loch Sween
- Bardsey Island and Lleyn peninsula
- Menai Strait
- Strangford Lough
- Rathlin Island
- The Ayres

- Maughold
- Derbyhaven/Langness
- Scarlett Point
- Port Erin Bay
- Calf of Man
- Niarbyl
- Portelet Bay, Jersey (Gubbay 1995)

## 1.4 Organization

### 1.4.1 Institutional Structure



ASMO: Environmental Assessment and Monitoring Committee

EUC: Eutrophication Committee

BDC: Biodiversity Committee

HSC: Hazardous Substances Committee

OIC: Offshore Industry Committee

RSC: Radioactive Substances Committee

INPUT: Working Group on Inputs to the Marine Environment

MON: Working Group on Monitoring

SIME: Working Group on Concentrations, Trends and Effects of Substances in the Marine Environment

ETG: Eutrophication Task Group

MASH: Working Group on Marine Protected Areas, Species and Habitats

EIHA: Working Group on the Environmental Impact of Human Activities

SPDS: Working Group on Substances and Point and Diffuse Sources

IGE: Informal Group of DYNAMEC experts

## 1.4.2 Ministerial Meetings

**Last Meeting:** Ministerial Meeting of the OSPAR Commission, Bremen 25 June 2003. For full text of the Convention link to the Bremen Statement link to: <http://www.ospar.org/eng/html/welcome.html>.

**Joint HELCOM/OSPAR Ministerial Meeting on 25-26 June 2003, in Bremen, Germany.** The OSPAR Commission held its annual meeting in Bremen in conjunction with HELCOM on 25-26 June 2003. The holding of such discussions at the highest level indicates the importance of co-operation on environmental protection for the adjoining marine waters of the North-East Atlantic and the Baltic Sea.

The ministerial representatives from the Helsinki and OSPAR Commissions stressed the following topics:

- The need for an ecosystem approach to the comprehensive management of all human activities that affect the marine environment;
- The opportunity to contribute to the EU initiative for a European Marine Strategy to enable all authorities involved in protecting the marine environment – on national and international level to collaborate effectively; and
- The need for joint action to protect threatened and declining species and habitats.

The two Commissions pledged to create by 2010 an ecologically coherent network of managed marine protected areas covering the North-East Atlantic and the Baltic Sea. A Joint Ministerial Declaration was also adopted. For full text of the Convention link to the Declaration of the Joint Ministerial Meeting of the Helsinki and OSPAR Commissions link to: <http://www.ospar.org/eng/html/welcome.html>.

## 1.4.3 Coordinating Unit

**The OSPAR Commission for the Protection of the Marine Environment of the North East Atlantic.** The OSPAR Commission administers the OSPAR Convention and develops policy and international agreements related to this field. The Commission is supported by an international secretariat based in London.

### **Contacts:**

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## 1.4.4 Committees

The function of the Environmental Assessment and Monitoring Committee (ASMO) is generally to review the condition of the maritime area, and the overall effectiveness of the measures taken and planned, and provide advice on priorities for action in accordance with Article 6 and Annex IV of the OSPAR Convention, 1992. The ASMO Committee also coordinates and implements the Joint Monitoring and Environmental Assessment

Programme (JAMP) of the Commission. The function of the Eutrophication Committee (EUC) is to facilitate the implementation of the OSPAR Strategy to Combat Eutrophication (Reference number: 1998-18). The Biodiversity Committee (BDC) facilitates the implementation of the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area (Reference number 1998-19). The function of the Hazardous Substances Committee (HSC) is to facilitate the implementation of the OSPAR Strategy with regard to Hazardous Substances (Reference number 1998-16) by the OSPAR Commission and to focus its work on the substances identified by OSPAR for priority action and to avoid duplication of work on hazardous. The Offshore Industry Committee (OIC) facilitates the implementation of the OSPAR Strategy on Environmental Goals and Management Mechanisms for Offshore Activities (Reference number 1999-12) by the OSPAR Commission. The function of the Radioactive Substances Committee (RSC) is to facilitate the implementation of the OSPAR Strategy with regard to Radioactive Substances (Reference number 1998-17) by the OSPAR Commission and take into account all recommendations and methodologies, as well as legally binding documents, that have been developed in other international fora, and which are relevant to the OSPAR Strategy with regard to Radioactive Substances (OSPAR Commission 2004). For further information link to: <http://www.ospar.org/eng/html/welcome.html>.

## **1.5 Partners/Observers**

Refer to Regional Seas Partnerships page on the main website.

# **2 Our Work**

## **2.1 Programme Strategy**

Link to Regional Seas Strategic Directions 2004-2007, downloadable documents.

## **2.2 Action Plan**

### **OSPAR Action Plan 1998-2003**

**Participating Countries:** (16) Belgium, Denmark, European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom (UNEP 2001)

**Objective:** In implementing the OSPAR Convention, 1992 the general objective of OSPAR is to prevent and eliminate pollution of the maritime area of the Convention and to ensure that the ecosystems of the maritime area are in a sustainable, sound and healthy condition and that human health is protected. In 1998 and 1999 the Commission adopted strategies for the purposes of directing its work in the medium to long term in the following five main areas:

1. Protection and conservation of ecosystems and biological diversity (cf. reference number 1998-19);
2. Hazardous substances (cf. reference number 1998-16);
3. Radioactive substances (cf. reference number 1998-17);
4. Eutrophication (cf. reference number 1998-18); and
5. Environmental goals and management mechanisms for offshore activities (cf. reference number 1999-12).

Together with the Joint Assessment and Monitoring Programme (JAMP) (cf. Joint PARCOM and OSCOM Recommendation 95/1), these strategies form a vital basis of the present Action Plan for the period 1998-2003 (OSPAR Commission 2004).

For full text of the Action Plan link to: <http://www.ospar.org/eng/html/welcome.html>.

## 2.2.1 Strategies

### **OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area**

**Objective:** To protect and conserve the ecosystems and the biological diversity of the maritime area which are, or could be, affected as a result of human activities, and to restore, where practicable, marine areas which have been adversely affected, in accordance with the provisions of the Convention, especially as it stands after the adoption of Annex V and Appendix 3 (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

### **OSPAR Strategy with regard to Hazardous Substances**

**Objective:** To prevent pollution of the maritime area by continuously reducing discharges, emissions and losses of hazardous substances (as defined in Annex 1), with the ultimate aim of achieving concentrations in the marine environment near background values for naturally occurring substances and close to zero for man-made synthetic substances (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

### **OSPAR Strategy with regard to Radioactive Substances**

**Objective:** To prevent pollution of the maritime area from ionising radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of concentrations in the environment near background values for naturally occurring radioactive substances and close to zero for artificial radioactive substances. In achieving this objective, the following issues should, inter alia, be taken into account:

- Legitimate uses of the sea;
- Technical feasibility;
- Radiological impacts on man and biota (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

### **OSPAR Strategy to Combat Eutrophication**

**Objective:** To combat eutrophication in the OSPAR maritime area, in order to achieve and maintain a healthy marine environment where eutrophication does not occur (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

### **OSPAR Strategy on Environmental Goals and Management Mechanisms for Offshore Activities**

**Objective:** The objective of the OSPAR Commission with regard to the setting of environmental goals for the offshore oil and gas industry and the establishment of improved management mechanisms to achieve them is to prevent and eliminate pollution and take the necessary measures to protect the maritime area against the adverse effects of offshore activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

**Strategy for a Joint Assessment and Monitoring Programme (JAMP).** The main objectives of the 2003 Strategy for a Joint Assessment and Monitoring Programme (JAMP)(Reference number 2003/22) are:

- The preparation of environmental assessments of the status of the marine environment of the OSPAR maritime area or its regions, including the exploration of new and emerging problems in the marine environment; and
- The preparation of contributions to overall assessments of the implementation of the OSPAR Strategies, including in particular the assessment of the effects of relevant measures on the improvement of the quality of the marine environment. Such assessments will help inform the debate on the development of further measures;

Supported by:

- The implementation of collective OSPAR monitoring, including the development of the necessary methodologies; and
- The preparation of environmental data and information products needed to implement the OSPAR Strategies (OSPAR Commission 2004).

For full text of the Strategy link to: <http://www.ospar.org/eng/html/welcome.html>.

## **2.3 Convention**

### **The Convention for the Protection of the Marine Environment of the North-East Atlantic**

**Short Title:** OSPAR Convention

**Year adopted:** 21-22 September 1992 (UNEP 2001)

**Year entered into force:** 25 March 1998 (UNEP 2001)

**Supersedes:** Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1974) and the Paris Convention for the Prevention of Marine pollution from Land-Based Sources (1978) (UNEP 2001)

**Contracting Parties:** (16) Belgium, Denmark, European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom (UNEP 2001)

**Depositary State:** France (UNEP 2001)

For full text of the Convention link to: <http://www.ospar.org/eng/html/welcome.html>.

## 2.3.1 Annexes

### **Annex I on the prevention and elimination of pollution from land-based sources**

**Year adopted:** 21-22 September 1992 (UNEP 2001)

**Year entered into force:** 25 March 1998 (UNEP 2001)

### **Annex II on the prevention and elimination of pollution by dumping or incineration**

**Year adopted:** 21-22 September 1992 (UNEP 2001)

**Year entered into force:** 25 March 1998 (UNEP 2001)

### **Annex III on the prevention and elimination of pollution from offshore sources**

**Year adopted:** 21-22 September 1992 (UNEP 2001)

**Year entered into force:** 25 March 1998 (UNEP 2001)

### **Annex IV on the assessment of the quality of the marine environment**

**Year adopted:** 21-22 September 1992 (UNEP 2001)

**Year entered into force:** 25 March 1998 (UNEP 2001)

### **Annex V on the protection and conservation of the ecosystems and biological diversity of the maritime area**

**Year adopted:** 1998

Has now entered into force

#### **Ratification**

<b>Contracting Party</b>	<b>Ratification</b>	<b>Entry into force</b>
Finland	4 February 1999	30 August 2000
Spain	8 December 1999	30 August 2000
Switzerland	11 February 2000	30 August 2000
Luxembourg	14 February 2000	30 August 2000
European Community	29 May 2000	30 August 2000
UK	29 June 2000	30 August 2000
Denmark	31 July 2000	30 August 2000
Sweden	5 September 2000	5 October 2000
Iceland	18 June 2001	18 July 2001
Norway	22 June 2001	22 July 2001
Netherlands	25 July 2001	24 August 2001
Germany	14 December 2001	13 January 2002
Ireland	22 May 2003	21 June 2003

(OSPAR Commission 2004)

**For full text of the Annexes link to:** <http://www.ospar.org/eng/html/welcome.html>.

## **2.4 Issues and Threats**

### **2.4.1 Habitat and Species Loss**

Seagrass beds are found throughout the region where conditions are suitable. Seagrass beds are important nursery areas for juvenile fish, they also help to stabilize the sediment and are an important source of organic matter. They are vulnerable to damage from a variety of activities. Threats include fishing techniques that disturb the seabed, dredging, anchor damage and trampling (Gubbay 1995).

Intertidal Mud and Sandflats habitats are also found throughout the region and are vulnerable to damage from many activities such as land reclamation, dredging, land fill and industrial pollution. For example, more than 32,000 ha of the German Wadden Sea has been reclaimed since 1963 and in the U.K. some areas have lost up to 90 % of their intertidal area to land claims (Gubbay 1995).

Coastal zone habitats are of major importance for birds and of considerable conservation concern. A recent analysis of the conservation status of birds in Europe has shown that some 50 Species of European Conservation Concern (SPECs) use these habitats at some point in their life cycle, out of a total of 227 SPECs in Europe. Of these 42 have an unfavorable conservation status in Europe because they are declining, rare, or highly localized. These include four globally threatened species; ferruginous duck (*Aythya nyroca*), the Spanish imperial eagle (*Aquila adalberti*) and the highly threatened slender-billed curlew (*Numenius tenuirostris*) and Audouin's gull (*Larus audouinii*). Six other species have coastal habitats that have an unfavorable conservation status in Europe also have over half their global population in Europe including the near globally threatened pygmy cormorant (*Phalacrocorax pygmeus*) (Gubbay 1995).

Other species within the OSPAR region that are endangered include the cetaceans. There are many threats to cetaceans ranging from incidental catch by fisheries, disturbance, accumulation of pollutants in body fat causing tumors and breeding failure, and depletion of prey species (Gubbay 1995).

### **2.4.2 Land Based Sources of Pollution**

Sources of marine litter are mainly generated by shipping (fishing and commercial) and tourist activities. Floating litter and sunken pieces have been found in large quantities in all regions of the OSPAR maritime area. Impacts on marine life include the drowning of birds entangled in plastic sheeting, and the death of birds, turtles and cetaceans caused by ingested plastic objects. Litter has also been found to carry a variety of epiphytic organisms to sea areas that these organisms would not normally reach. Economically, the recreational and commercial fishing sectors are likely to be most affected by litter. As tourism, urban development and industrial pressure for development in the coastal zone increase, the problem of litter may also increase (OSPAR Commission 2000).

Eutrophication resulting from increased nutrient loads is widespread in estuaries, fjords and coastal areas of the eastern part of the North Sea, the Wadden Sea, the German Bight, the Kattegat, and the eastern Skagerrak. The human health and economic consequences of harmful blooms and the accumulation of toxins in shellfish and other biota are a cause for concern (OSPAR Commission 2000).

Heavy metals from land based sources of pollution pose a risk to the marine environment in a number of ways. Dissolved copper can affect lower trophic levels such as phytoplankton.

Other metals, such as cadmium, mercury and lead, can accumulate in shellfish and in top predators (including man). In estuaries and in the coastal zone, metal concentrations of cadmium, lead, mercury and copper in water and sediments can exceed the Ecotoxicological Assessment Criteria (EAC), indicating concern for effects on biota. Furthermore, several heavy metals have been observed to travel long distances in the atmosphere, causing transboundary pollution in pristine areas such as the Arctic (OSPAR Commission 2000).

Apart from their intrinsic properties of toxicity, persistence, and liability to bioaccumulate, there is clear evidence that a diverse range of natural and man-made substances (including TBT and various other organometallic compounds, PCBs, dioxins, and certain pesticides, pharmaceuticals and industrial chemicals), have potential to impair the reproductive process in aquatic organisms, for example through interference with their endocrine (hormonal) systems, even at very low ambient concentrations. Exposure to TBT, originating from antifouling treatments, produces distinctive endocrine-disrupting responses in a number of organisms, including shell thickening in Pacific oysters and 'imposex' (development of the sexual characteristics of the other sex) in gastropods. Significant levels of imposex in dogwhelks are found in those estuarine and coastal areas of the Convention area with the heaviest concentrations of shipping and ship-related activity. Imposex has been documented in dogwhelks and common whelks in harbours in northern Portugal, north-west Spain, Iceland, Norway and Svalbard, as well as in British and Irish waters and the North Sea region, including the Kattegat (OSPAR Commission 2000).

Despite a ban on the production of, and the introduction of controls on the marketing and use of, PCBs are still a contaminant in the region. High concentrations are found in biota, especially in the fatty tissues of birds, marine mammals and mussels. PCBs can disturb enzyme and endocrine systems in marine mammals (e.g. harbour seals (*Phoca vitulina*) in the Wadden Sea) (OSPAR Commission 2000).

Sources of PAHs include domestic and industrial combustion of fossil fuels, oil spills, emissions from offshore installations and ship exhausts, and sediments. Concentrations in sediments often exceed the EAC. There is evidence of a correlation between the occurrences of pre-stages of liver tumours in North Sea flatfish and of contaminants, particularly PAHs and possibly chlorinated hydrocarbons. Although the use of most organochlorine pesticides has been phased out (for example, DDT since 1979 see Council Directive 79/117/EEC), they are still detected in the marine environment, due to their extreme persistence, to illegal use or to use elsewhere. Concentrations of DDE, a metabolite of DDT, still exceed EAC in mussels and fish in some areas (OSPAR Commission 2000). For further information refer to: the OSPAR List of Substances of possible Concern <http://www.ospar.org/eng/html/welcome.html>.

### **2.4.3 Sea Based Pollution**

Shipping can impact upon the marine environment in a number of ways. In the OSPAR maritime area, such impacts are mainly the result of either accidental or intentional inputs of noxious substances and/or organisms to the environment. These inputs can include the introduction of non-indigenous species, air pollution emissions, operational discharges, or the loss of a vessel and/or cargo. In recent years, cargo lost from ships has included phosphorus ore, pesticides and both mineral and vegetable oil. Discharges of the latter group of substances, although permitted in some cases, have still caused the death of many seabirds and continue to be a major concern (OSPAR Commission 2000).

The greatest potential for damage from shipping disasters lies in the spilling of hazardous materials close to ecologically sensitive areas (e.g. spawning grounds, bird colonies, nature conservation areas), or centres of human activities (e.g. mariculture sites, tourist centres). Oil

spills from tanker accidents do have major economic and biological impacts, including effects on mariculture and loss of wildlife. Since August 1999, discharges of oil or oil mixtures from shipping are prohibited in the North West European Waters Special Area (established by the IMO under MARPOL Annex 1). There have also been improvements in the availability of harbour reception facilities in many ports. However, there are still many ships cleaning tanks or discharging bilge water with oil content of more than 15 ppm at sea, resulting in the oiling of seabirds, shellfish, other organisms and the coastline. Pollution from such illegal activities remains at an unacceptably high level, so far without a clear downward trend (OSPAR Commission 2000).

Oil inputs from produced water from offshore installations have increased progressively as oil fields have matured and the number of installations has increased, particularly in the North Sea. They now constitute the largest source of oil for the oil and gas sector. Leaching from old drill cuttings is a possible source of oil. Changes to benthic communities have been identified over areas surrounding established oil and gas production platforms. Impacts are largely caused by past disposals of cuttings contaminated with oil and chemicals in the immediate vicinity of some platforms. There is a consequent reduction in species diversity near platforms. Biological changes from this cause have been detected up to 3 km from such installations. Discharges of produced water from the offshore oil and gas industry are increasing. In addition to 'oil', produced water also contains a range of other natural organic compounds including monocyclic aromatic hydrocarbons, 2- and 3-ring PAHs, phenols and organic acids. Offshore oil and gas activities are expanding into deeper waters and into environments seasonally covered by ice. The risk of accidental releases of oil will increase due to the depth of operations and the difficulties of taking remedial actions in cold environments (OSPAR Commission 2000).

#### **2.4.4 Exploitation of Resources**

Fishing has great economic and social importance for most OSPAR countries, and technical developments have led to more efficient exploitation of commercial fish stocks. A large proportion of fish stocks are overexploited and it is very important that fishing is managed in a sustainable way (OSPAR Commission 2000).

Most mollusc stocks are heavily exploited, and some scallop and cockle fisheries are giving rise to management concerns. The overall objective of fisheries management is to ensure sustainable use of fish resources. Management of the fisheries in the OSPAR Convention area is regulated within EU waters under the EU Common Fisheries Policy, and within Faroese, Icelandic and Norwegian waters by national policy and legislation. There is a general overcapacity in most of the fleets fishing in the OSPAR area. The EU and the Icelandic and Norwegian authorities have implemented measures intended to decrease the fishing effort by special programmes. In the EU fleet the reduction has been compensated for by an increase in efficiency, with the result that no reduction in fishing pressure is achieved. The Northeast Atlantic Fisheries Commission (NEAFC) aims at promoting conservation and optimal utilisation of straddling fish stocks in the North-East Atlantic area. For the North Sea, the Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues held in 1997 (IMM 1997) recognised problems to achieve agreed goals and requested the development and application of an ecosystem approach to the management and protection of the North Sea. The International Commission on Conservation of Atlantic Tuna (ICCAT) is responsible for the international management of the fisheries of large pelagic tuna and tuna-like fish (OSPAR Commission 2000).

A wide range of national conservation measures have been introduced to protect vulnerable life stages of different stocks, including permanent inshore nursery areas, temporary closures to protect juvenile fish and spawning area closures at peak spawning times of the year. A 12

nautical mile coastal limit to exclude large trawlers is in place in most regions and technical conservation measures such as mesh sizes and sorting grids are widely used to reduce the capture of juvenile fish. Other measures have been aimed at restricting effort through licensing schemes and days at sea limitations (OSPAR Commission 2000).

For further information refer to:

The Northeast Atlantic Fisheries Commission <http://www.neafc.org/>.

The International Commission on Conservation of Atlantic Tuna (ICCAT) <http://www.iccat.es/>.

The Intermediate Ministerial Meeting (IMM) on the Integration of Fisheries and Environmental Issues in 1997 <http://www.ices.dk/products/newsletters/30/imm97.htm>.

OSPAR Commission (2000) Quality Status Report 2000. Published by OSPAR Commission, London 2000, ISBN 0 946956 52 9

#### **2.4.5 Sand and Gravel Extraction**

Sand and gravel are essential materials for private and industrial construction work, for coastal protection and beach replenishment. Annually, 43 million m<sup>3</sup> are extracted from the OSPAR area. By far the largest amount is taken from the North Sea, where extraction increased from 34 to 40 million m<sup>3</sup> in the period 1989 to 1996. Along the Atlantic coast of France annual extractions amount to around 4 million t. Maërl banks (calcarean algae) which support fragile ecosystems and shell sands are exploited mainly along the Brittany coast. The exploitation of marine aggregates can have negative effects on the marine environment. Turbidity is temporarily increased during operation. The main impact on the ecosystem is the disturbance and loss of benthic organisms from the extraction site. There can be damage to sites that act as spawning areas for fish that lay their eggs directly on gravel (for example, herring). In addition, extraction activities can increase the instability of shallow banks and increase the potential for coastal erosion. The rate of recovery of a site depends on the modifications made to the substrate and the potential of the benthos to recolonise the area. This may take from a few months to more than a decade (OSPAR Commission 2000).

#### **2.4.6 Alien Species**

In the OSPAR maritime area, over 100 non-indigenous species have been recorded, mainly in the North Sea, the Celtic Sea, the Bay of Biscay and along the Iberian coast. The main vectors of such unintentional introductions are ships' ballast water and associated sediments, and fouling on ships' hulls, although mariculture is also a significant vector (OSPAR Commission 2000).

#### **2.4.7 Tourism**

In all OSPAR regions tourism has been growing steadily. In the absence of stringent planning controls and sensitive development policies, the attributes of coastal areas that are most attractive to visitors such as unspoilt landscapes, clean uncrowded beaches, sea water fit for bathing and wildlife refuges, can be harmed by the sheer number of visitors, construction, and excessive vehicle and pedestrian traffic (OSPAR Commission 2000).

#### **2.4.8 Climate Change and Sea Level Rise**

There is general agreement by the IPCC that increases in greenhouse gases are contributing to global warming. Work by the IPCC using Global Circulation Models predicts that, by 2100, the surface air temperature of the North-east Atlantic will have increased by approximately 1.5 °C, the sea level will have risen by 25 to 95 cm, mean precipitation will have risen and there will be an increased frequency and intensity of extreme events such as storms. Projections of future climate indicate that precipitation in high latitudes of Europe may increase, with mixed results for the other parts of Europe. Water supply may be affected by

floods in northern Europe and by droughts in southern Europe. These changes may lead to major climate system changes with resulting impacts on the ocean and its biota.

Potential changes may occur in ocean current strength and transport, water mass formation rates, sea level height, the strength and frequency of weather systems, and rainfall and run-off with downstream effects on ecosystems and fisheries. Predicted rises in sea level are of particular concern especially for the Dutch coastal zone, other low-lying areas and intertidal habitats of the OSPAR region. The formation of North Atlantic Deep Water constitutes one of the deepest branches of the thermohaline circulation of the world's oceans; any changes in the level of formation of this water in the Arctic may change the thermohaline circulation and result in a colder climate in Europe.

For further information refer to:

OSPAR Commission (2000) Quality Status Report 2000. Published by OSPAR Commission, London 2000, ISBN 0 946956 52 9

IPCC [www.ipcc.ch](http://www.ipcc.ch).

## **2.5 Current Activities**

### **Strategy for a Joint Assessment and Monitoring Programme (JAMP)**

**Period:** 2003- 2010

#### **Assessment Schedule:**

#### **2003**

- First assessments on human activities listed in Appendix 3, JAMP – miscellaneous offshore structures and installations, offshore wind-energy farms, sand and gravel extraction and tourism.

#### **2004**

- At least one further assessment in the series of assessments for the human activities listed in Appendix 3, JAMP.
- Assessments of atmospheric emissions and modelled depositions of nutrients.

#### **2005**

- An assessment of the pilot project on ecological quality objectives for the North Sea, and two of the series of assessments for the human activities listed in Appendix 3, JAMP.
- Assessments of temporal trends and (where relevant/possible) spatial distribution for the nutrients where periodic sampling and analysis is undertaken, in particular under CAMP, CEMP and RID.
- An assessment of the pilot project on ecological quality objectives for the North Sea.
- An assessment of temporal trends and (where relevant/feasible) spatial distribution for the hazardous substances where periodic sampling and analysis is undertaken, in particular under CAMP, CEMP and RID.
- An initial assessment of biological effects of hazardous substances in the maritime area.

#### **2006**

- An overview of OSPAR assessment work 1998 – 2006.
- An assessment of the status of the species and types of habitats that have been placed on the OSPAR List of threatened and/or declining species and habitats, on the basis of the application of the relevant selection criteria.
- An assessment of the changes in the distribution and abundance of marine species in relation to changes in hydrodynamics and sea temperature.
- One of the series of assessments for the human activities listed in Appendix 3, JAMP.

- An assessment of the achievement of the 50% reduction target using information obtained through implementation reporting on PARCOM Recommendations 88/2 and 89/4.
- An assessment of the expected eutrophication status of the OSPAR maritime area following the implementation of agreed measures.
- An assessment (for those regions where information is available) of the sources of discharges, emissions and losses of radioactive substances to the marine environment.

#### **2007**

- Two of the series of assessments for the human activities listed in Appendix 3.
- A trend analysis of all the different human activities listed in Appendix 3, JAMP and their collective impact on the OSPAR maritime area.
- An assessment of the eutrophication status of areas identified under the Common Procedure as problem areas and potential problem areas, and of any non-problem areas where there have been changes which give grounds for concern.
- An assessment of the impact on the marine environment of offshore oil and gas activities.
- An assessment of the possible effects of releases of oil and chemicals from any disturbance of cutting piles.
- An assessment (for those regions where information is available) of the exposure of humans to radiation from pathways involving the marine environment.

#### **2008**

- Two of the series of assessments for the human activities listed in Appendix 3, JAMP.
- The first 5-yearly assessment of emissions, discharges and losses of chemicals identified for priority action.
- An assessment (for those regions where information is available) of the impact on marine biota of anthropogenic sources (past, present and potential) of radioactive substances.
- An assessment (for those regions where information is available) (if possible) of the temporal trends and spatial distribution of concentrations of radionuclides and their fate in the marine environment.

#### **2009**

- A further assessment of the status of the species and habitats that have been placed on the OSPAR List of threatened and/or declining species and habitats, in the light both of the relevant selection criteria and relevant agreed ecological quality objectives.
- A more elaborated assessment of biological effects of hazardous substances in the maritime area.
- An assessment of temporal trends and (where relevant/feasible) spatial distribution for the hazardous substances where periodic sampling and analysis is undertaken under RID, CAMP and CEMP.
- A general assessment of the development in the quality status of the maritime area in relation to hazardous substances .
- An assessment of the extent and impact of offshore oil and gas activities, including the impacts on the marine environment of discharges of hydrocarbons and controlled offshore chemicals, both as they occur and from subsequent remobilization, together with an assessment of the significance for the marine environment of such impacts in relation to the natural changes which are occurring to the OSPAR maritime area.
- An overall assessment of radionuclides in the OSPAR maritime area.

#### **2010**

- An assessment of the quality status of the OSPAR maritime area and of its sub-regions (OSPAR Commission 2004)

For further information refer to: 2003 Strategy for a Joint Assessment and Monitoring Programme (JAMP) <http://www.ospar.org/eng/html/welcome.html>

## 3 Publications

For a full comprehensive list accompanied by downloadable documents link to:  
<http://www.ospar.org/eng/html/welcome.html>

### 3.1 Regional Seas Reports and Studies

Link to the Regional Seas Reports and Studies

### 3.2 Meeting Reports

For a full comprehensive list of summary records and meeting documents in downloadable formats link to <http://www.ospar.org/eng/html/welcome.html>.

### 3.3 Website Links

**OSPAR Commission** [www.ospar.org](http://www.ospar.org).

**JNCC** (Joint Nature Conservation Committee) [www.jncc.gov.uk](http://www.jncc.gov.uk)

**NEAFC** (The Northeast Atlantic Fisheries Commission) <http://www.neafc.org/>.

**ICCAT** (The International Commission on Conservation of Atlantic Tuna)  
<http://www.iccat.es/>.

**NASCO** North Atlantic Salmon Conservation [www.nasco.int](http://www.nasco.int)

**ICES** International Council for the Exploration of the Sea [www.ices.dk](http://www.ices.dk)

**NAMMCO** North Atlantic Marine Mammal Commission [www.nammco.no](http://www.nammco.no)

**KIMO** (Kommunenenes Internasjonale Miljøorganisasjon) : Local Authorities International Environmental Organisation <http://www.zetnet.co.uk/coms/kimo/index.html>.

**SEPA** (Scottish Environment Protection Agency) <http://www.sepa.org.uk/>.

**EA** (Environment Agency) UK [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

**Nordic Fishermens Council** (in Norwegian) <http://fisk.norden.org/fisk/sk/index.asp>.

**NetCoast** A Guide to Integrated Coastal Zone Management <http://www.netcoast.nl/>.

**MedCoast** <http://www.medcoast.org.tr>.

**Medsetcon** (Mediterranean Sea Turtle Network)

<http://www.medcoast.org.tr/medsetcon/index.html>.

**EUCC Coastal Guide** <http://www.coastalguide.org/>.

**North Sea Ministerial Declarations** <http://odin.dep.no/md/nsc/declaration/index-b-n-a.html>.

**ACOPS** (Advisory Committee on the Protection of the Sea) <http://www.acops.org/>

**BirdLife International** [www.birdlife.net](http://www.birdlife.net)

**Conference of Peripheral Maritime Regions of Europe** [www.cpmr.org](http://www.cpmr.org)

**EUROPECHE**, Association of National Fisheries Organisations

**OGP** (International Association of Oil and Gas Producers) [www.ogp.org.uk/](http://www.ogp.org.uk/)

**PIANC** (International Navigation Association) [www.pianc-aipcn.org](http://www.pianc-aipcn.org)

**Seas at Risk** [www.seas-at-risk.org](http://www.seas-at-risk.org)

**UEPG** (Union européenne des producteurs de granulats/European Aggregates Association)  
[www.uepg.org](http://www.uepg.org)

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