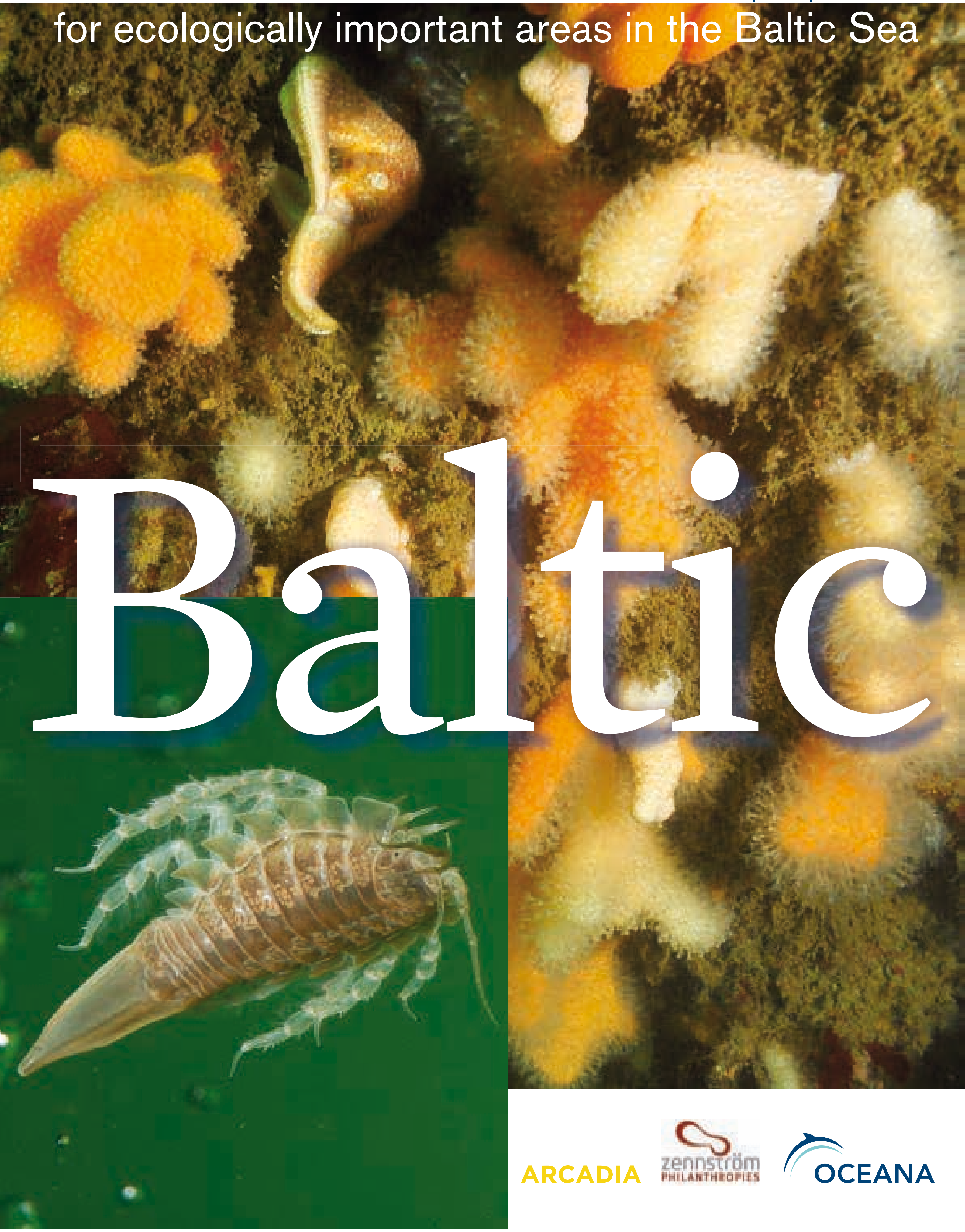
Conservation proposals

for ecologically important areas in the Baltic Sea

Baltic



ARCADIA

zennström PHILANTHROPIES

OCEANA

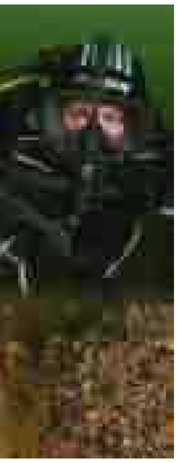
Conservation proposals for ecologically important areas in the Baltic Sea

Baltic

ARCADIA

zennström PHILANTHROPIES

OCEANA



Index

1. Introduction 04

2. Characteristics of the Baltic Sea 10

Status of the Baltic Sea 14

Management of the protected areas network in the Baltic Sea 18

3. Methods 20

4. Baltic Sea species, habitats and communities 24

Classification of habitats and communities 27

Pelagic, offshore (deep) waters 28

Benthic habitats and communities 28

4.1 Reefs 28

4.1.1 *Mytilus* beds

4.1.2 *Modiolus* beds

4.2 Submarine structures made by leaking gases 30

4.2.1 Bubbling reefs and gas seepages

4.2.2 Pockmarks

4.3 Sandbanks 31

4.4 Macrophyte meadows and beds 31

4.4.1 Macroalgae communities

4.4.2 Kelp

4.4.3 *Chara* meadows

4.4.4 Sea grass meadows

4.4.5 Water moss



4.5 Soft bottom communities 35

4.5.1 *Macoma* community
4.5.2 *Abra* community
4.5.3 Echinoderms
4.5.4 *Haploops* communities
4.5.5 Tube worm communities
4.5.6 *Saduria* community
4.5.7 *Monoporeia* community
4.5.8 Sea pens with burrowing megafauna
4.5.9 Maerl beds

4.6 Sponge communities 40

4.7 Coral gardens 41

5. Results 42

5.1 Kattegat 45

5.1.1 Kattegat trench
5.1.2 Djupa rännan trench
5.1.3 Groves Flak

5.2 Ven island 57

5.3 Klints bank 62

5.4 Hanko peninsula 64

5.5 Åland Islands 67

5.6 Bothnian Bay 71

5.6.1 Bothnian Bay deep
5.6.2 Ulkokrunni

6. Conclusions 76

7. Recommendations for the better protection and management of Baltic Sea biodiversity 82

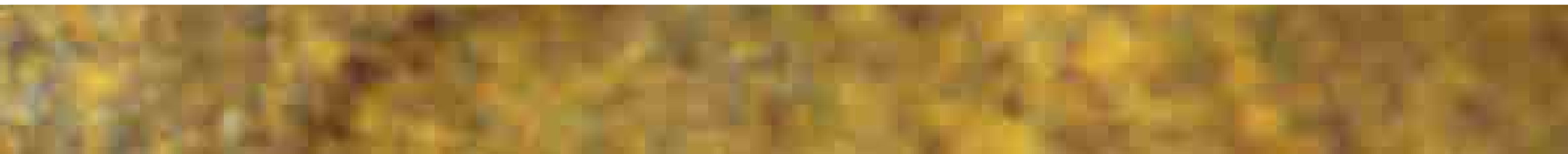
Annex 88

Annex I 90

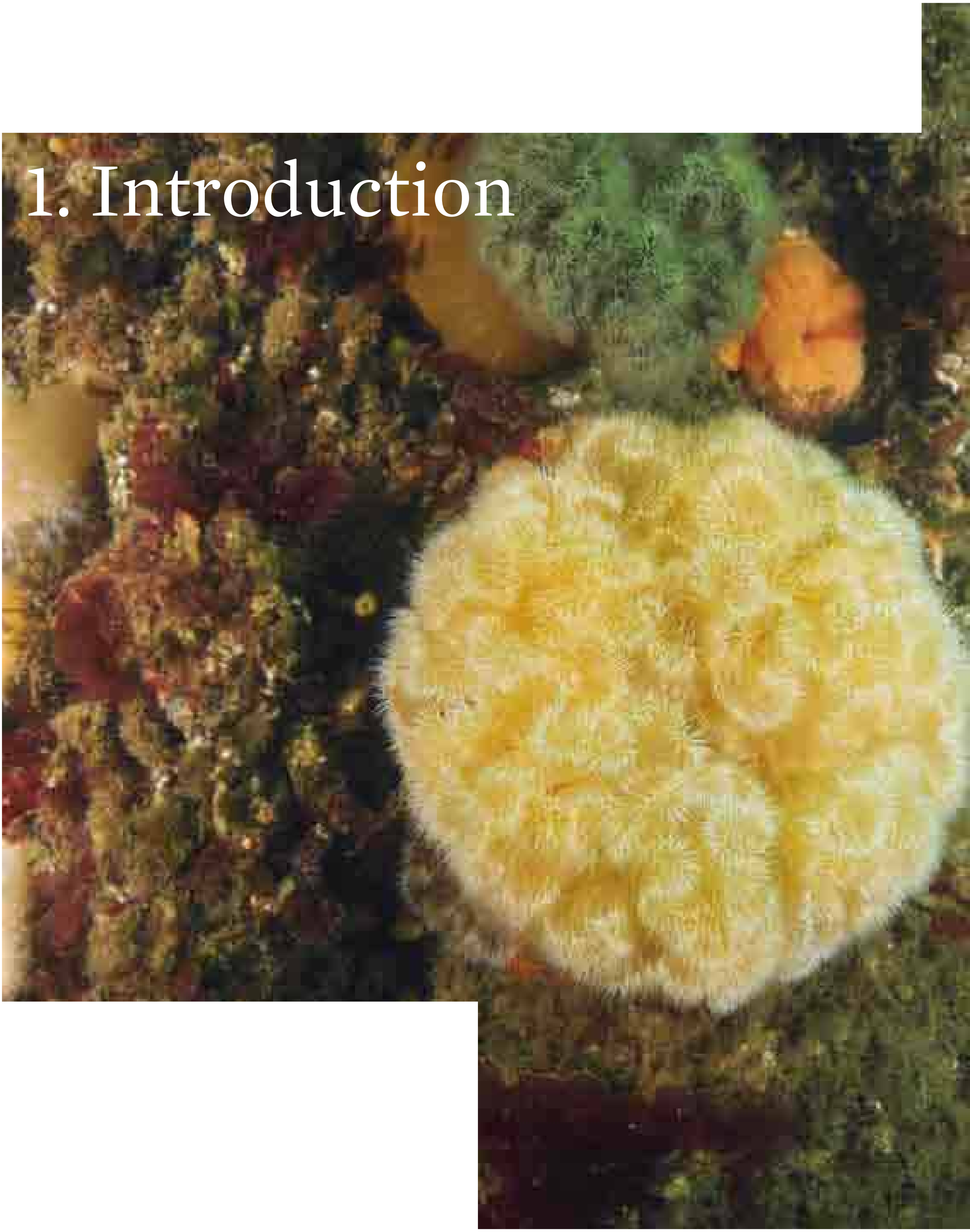
Annex II 114

Annex III 118

References 122



1. Introduction



Bubbling reef with rich biodiversity, Kattegat. © OCEANA/ Carlos Minguell

Trawlers hauling the nets, the Bothnian Bay, Sweden. © OCEANA/ Carlos Minguell

The Baltic Sea is one of the most peculiar seas in the world. With an average depth of only 55 meters, it is much shallower than oceans. The salinity of the Baltic Sea varies from levels similar to the ocean in Kattegat to sweetwater salinity levels in the Bay of Bothnia. Besides its unique biodiversity, the Baltic Sea is also extremely valuable to the 85 million inhabitants living in the catchment area. The coastline is shared by nine countries: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, The Russian Federation, and Sweden.

Due to its brackish conditions, the Baltic Sea is a highly stressful environment for most marine organisms. Only a limited number of species have successfully colonized this special environment. The salinity is too low for most Atlantic and North Sea species, and too high for many freshwater species. Still, a mixture of marine and freshwater species has adapted to this brackish water environment. The Baltic Sea is also a relatively young sea and; therefore, colonization of species since the last glacial period is still on-going (Bonsdorff 2006). Due to these physical facts, the Baltic Sea is characterized with special biodiversity and simple systems where each species plays an important role in maintaining the structure and dynamics of the whole system. If one species disappears, it may cause irreversible damage to the whole network because no other species may have the same ecological requirements to replace the vanished one. These factors make the Baltic Sea a particularly fragile ecosystem. It is extremely vulnerable to human induced pollution and disturbances. Tragically, this fragile sea is currently considered to be one of the most polluted sea areas in the world (HELCOM 2010a). The ecosystems of the Baltic Sea are severely threatened and disturbed mainly by eutrophication, destructive fishing practices and overfishing, loss of habitats and species, inputs of harmful substance and intense maritime traffic.

Oceana, founded in 2001, is the largest international organization focused solely on ocean conservation and the protection of marine ecosystems and endangered species. Offices in Europe, North America, Central America and South America work together on a limited number of directed campaigns to help return the oceans to their former levels of richness.

Red seaweed (*Delesseria sanguinea*), baked bean ascidian (*Dendrodoa grossularia*), breadcrumb sponge (*Halichondria panicea*), Kattegat, Sweden. © OCEANA/ Carlos Minguell

In the beginning of 2011, Oceana opened a new office in Copenhagen to further concentrate its efforts on the conservation of the Baltic Sea. Work in Copenhagen started with a two month research expedition covering all of the sub-basins and countries of the Baltic Sea. In the course of the expedition, Oceana documented biodiversity and its status both inside designated marine protected areas and in areas not currently protected, some of which were identified as important marine habitats and ecosystems that deserve protection.

The little mermaid with Hanse Explorer in the background in the harbour of Copenhagen, Denmark.
© OCEANA/ Carlos Minguell

Oceana's goal is to have 30 per cent of the Baltic Sea effectively conserved with well-managed marine protected areas and strictly protected no-take zones, particularly in areas with important fish habitats. This report introduces the main findings of the expedition and, based on the evidence collected, proposes new areas to be included in the current network of protected areas.

These findings will also promote the work already in motion by several political European Union (EU) processes. The primary EU process that is currently on-going is the implementation of the Marine Strategy Framework Directive (MSFD, Anon. 2008) that obliges Member States to achieve "Good Environmental Status" for the Baltic Sea by 2020 through an integrated approach to ecosystems and efforts to contain human activities within sustainable levels. Good Environmental Status means that the overall state of the environment in marine waters provides ecologically diverse and dynamic oceans and seas which are healthy and productive. Use of the marine environment must be kept at a sustainable level that safeguards potential uses and activities by current and future generations. This means the structure, functions and processes of marine ecosystems have to be fully considered, marine species and habitats must be protected and human-induced decline of biodiversity prevented.

Nudibranch eggs, Kattegat, Denmark.
© OCEANA/ Carlos Minguell

The main legal obligations concerning designation of Marine Protected Areas (MPAs) in the EU are provided in the Habitats Directive (Anon. 1992) in the form of the Natura 2000 network. The Natura 2000 network aims to insure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and Special Protection Areas (SPAs) designated by Member States under the Birds Directive (Anon. 1979). A significant shortcoming of the Natura 2000 network is that it focuses on the protection of habitats and species that have community importance as listed in the Annexes of the Habitats Directive. However the lists disregard several important marine features, particularly those of the benthic communities that also need to be protected. The MSFD, though, offers better possibilities to overcome this weakness by requiring member states to establish MPAs not only under the Habitats and Birds Directives but also under international or regional agreements to which the European Community or Member States concerned are parties in order to achieve good environmental status.

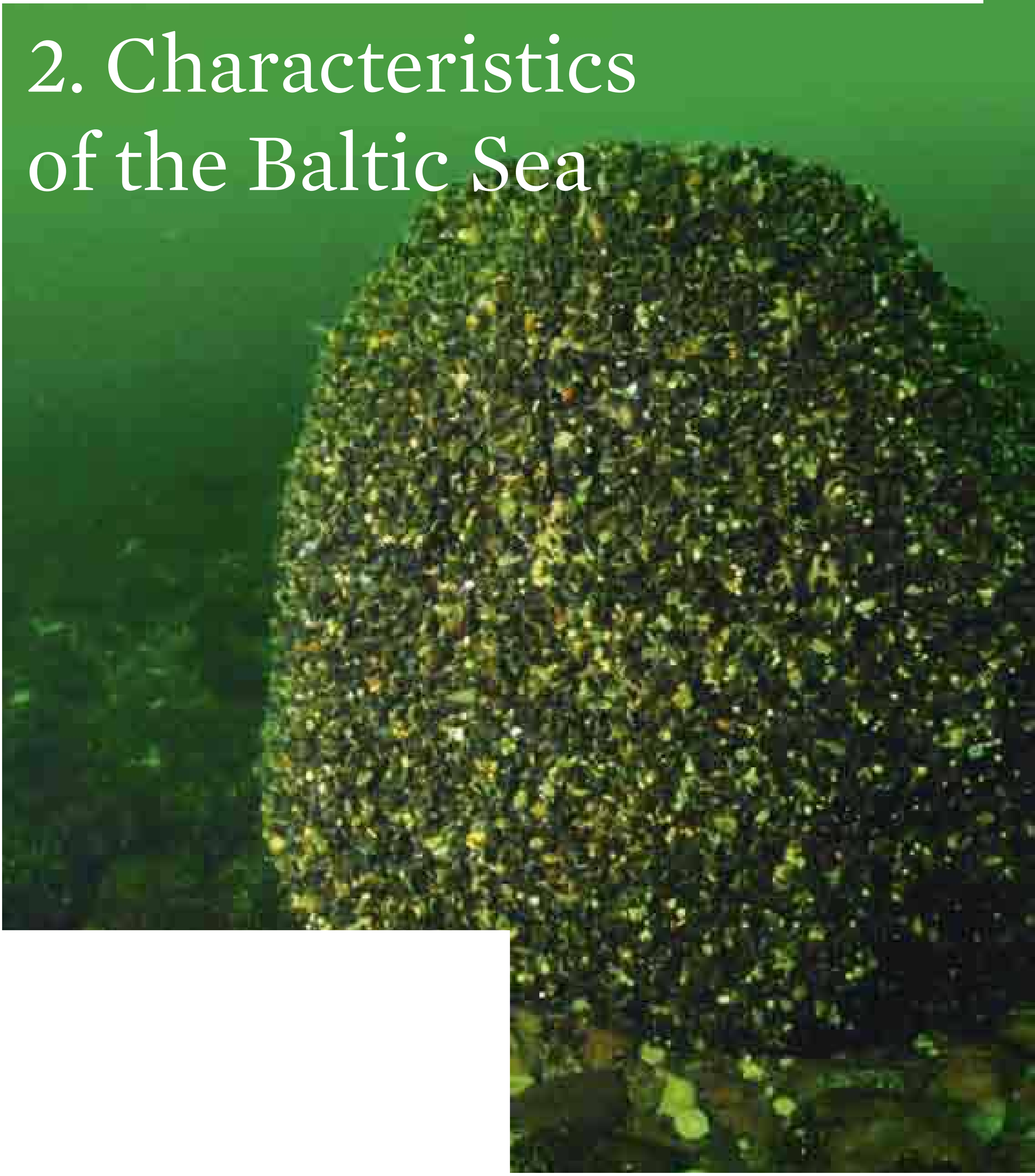
In addition, in June 2011 the European Commission adopted the new EU 2020 biodiversity strategy (European Commission 2011) to halt the loss of biodiversity and ecosystem services in the EU by 2020. The strategy includes six main targets, and 20 actions to help Europe reach its goal. Among others the strategy includes actions on fish stocks, species, habitats and ecosystems. The key tool is the full implementation of the MSFD and the Birds and the Habitats Directives.

Presently, there are several international conventions and political initiatives aiming to improve the health of the marine environments, and also that of the Baltic Sea. For example, conventions like CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and CBD (Convention on Biological Diversity) are highly relevant for the trade of threatened species of the Baltic Sea and for the establishment and management of marine protected areas.

However, for the past 30 years, the main regional actor in the Baltic Sea has been the Helsinki Commission, or HELCOM, which is the governing body of the "Convention on the Protection of the Marine Environment of the Baltic Sea Area". HELCOM steers the environmental commitments of Member States surrounding the Baltic Sea, including the latest initiative concerning the Baltic: the Baltic Sea Action Plan (HELCOM 2007a), which aims to restore the good ecological status of the Baltic marine environment by 2021. It also requires the Baltic Sea countries to create an ecologically coherent network of well-managed MPAs. Additionally, another regional sea actor, OSPAR (the Oslo and Paris Conventions for the protection of the marine environment of the North-East Atlantic) covers Kattegat region. When interpreting the results from Kattegat, OSPAR work is also referred to.

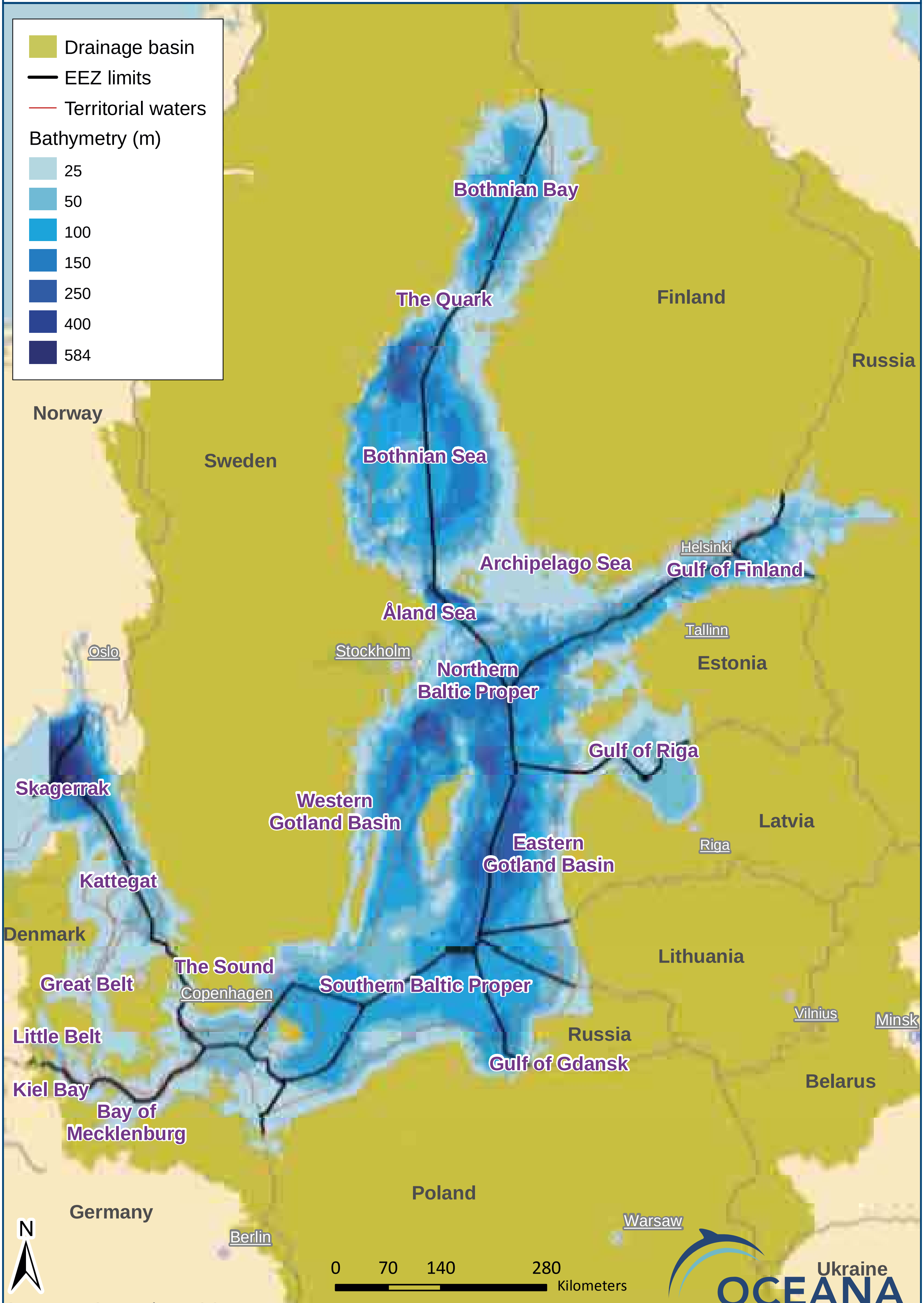
Dead common eider (*Somateria mollissima*) in shallow water at the Åland Islands, Finland. © OCEANA/ Carlos Suarez

2. Characteristics of the Baltic Sea



Diving at blue mussel bed (*Mytilus* sp.) in the Northern Baltic Proper, Sweden. © OCEANA/ Carlos Minguell

Figure 1



Sources: ESRI and HELCOM.

The Baltic Sea is comprised of the actual Baltic Sea, the Danish Straits and Kattegat. It is the second largest brackish water body in the world after the Black Sea. The Baltic Sea covers 415,200 km^2 and has a catchment area four times as large (Figure 1). There is practically no tide in the Baltic Sea (Hällfors *et al.* 1983). This, and other factors, makes its environment unique.

The glacial and post-glacial periods have formed the Baltic Sea into its present shape, with numerous large inlets, bays, lagoons and archipelagos located along the coastline. Changing salinity conditions, with both marine and freshwater phases, have fluctuated over the past 10,000 years. The life of today's Baltic Sea is less than 4,000 years old (Berglund *et al.* 2005). In terms of ecological history this is a short time period, so the Baltic Sea still offers ecological niches available for immigration (Bonsdorff 2006). Moreover, the Baltic Sea is an extremely dynamic system. During the past one hundred years, it has undergone decadal variations in salinity, oxygen and temperature (Winsor *et al.* 2001).

Stockholm archipelago.
© OCEANA/ Carlos Minguell

ROV footage of stratification of the water column on 102 m depth at Gotland deep in the Eastern Gotland Basin. © OCEANA

The main cause of the Baltic Sea's originality is the slow water exchange via the shallow Danish straits from the salty North Sea, and the run-off from freshwater rivers around the sea. This forms brackish water conditions with an average salinity of approximately 6-8 psu which is very low, especially when compared to the salinity of the ocean (ca. 35 psu). Salinity levels are even lower in the sea's semi-enclosed bays, and the most northern and eastern parts of the Baltic Sea, which have major freshwater inflows, such as the Bothnian Bay, the Gulf of Finland and the Gulf of Riga. The surface layer of the Baltic Sea consists mostly of the outflow of brackish water to the ocean, while more saline water inflows to the Baltic at sub-surface levels. Therefore, there is a permanent stratification of the water column and this forms a barrier, between the less saline surface and more saline bottom, called a halocline. Additionally, another stratification called a thermocline forms between the colder bottom water and warmer surface water; however, this disappears during the winter when the surface water cools and the whole sea is mixed by storms.

These barriers have a significant effect on seabed life since they prevent the mixing of oxygen rich surface waters with bottom waters, creating hypoxia and anoxia in the Baltic's deeper areas. At the same time, pollutants and nutrients become trapped at the bottom layers leading to the formation of "dead zones", covering up to 100,000 km^2 along the Baltic Sea's bottom (e.g. Ærtebjerg *et al.* 2003a, b).

In Kattegat, large island reefs and sandbanks dominate, while ancient river channels form the deepest parts of the area. Kattegat's seabed mostly includes a mixture of sand, gravel and boulders. The transition from Kattegat to the Baltic Sea is through shallow sills in the Danish straits. The Baltic Sea is split into several basins (Figure 1). The deepest one is 459 m and is in Landsortsdjupet, Sweden. The average depth of the Baltic Sea is only 55 meters.

The southern coast of the Baltic Sea is mainly characterized by sandy shores and lagoons separated from the sea by gravel and sand banks. More to the north in the Archipelago Sea, and in the western Baltic Proper, crystalline bedrock formed by granite or gneiss is exposed and forms numerous skerries and islands which almost bridge the area between Finland and Sweden. The northern part of the Bay of Bothnia is mostly bedrock peppered with many small gravely bays and lagoons. This area is also influenced by massive land rise - where the sea slowly develops into land.

Swedish coast in the Bothnian Sea.
© OCEANA/ Carlos Suarez

Sandy bottom with red algae in Kiel Bay, Germany. © OCEANA/ Carlos Minguell

The eastern part of the Baltic Sea is formed by sedimentary deposits consisting of boulders, pebbles, gravel and sand; as well as limestone and clay deposits toward the south. Limestone cliffs are common along the Estonian coastline, while moraine cliffs are found along Lithuania and the western Latvian coast. A sandy bottom dominates the seabed here (but a soft bottom is also found in Estonian waters).

Status of the Baltic Sea

Since the Baltic Sea is small, almost enclosed, and surrounded by tens of millions of people living in its catchment area, the sea's biodiversity is severely sensitive to, and threatened by, human activity. Pollution by nutrients and other harmful substances as well as destructive fishing methods produce the most harmful effects on the Baltic Sea ecosystems and their components. Other anthropogenic pressures like intense maritime traffic, extraction of sand, gravel etc. from the sea bottom as well as inshore and offshore installations also lead to disturbance of species and habitats

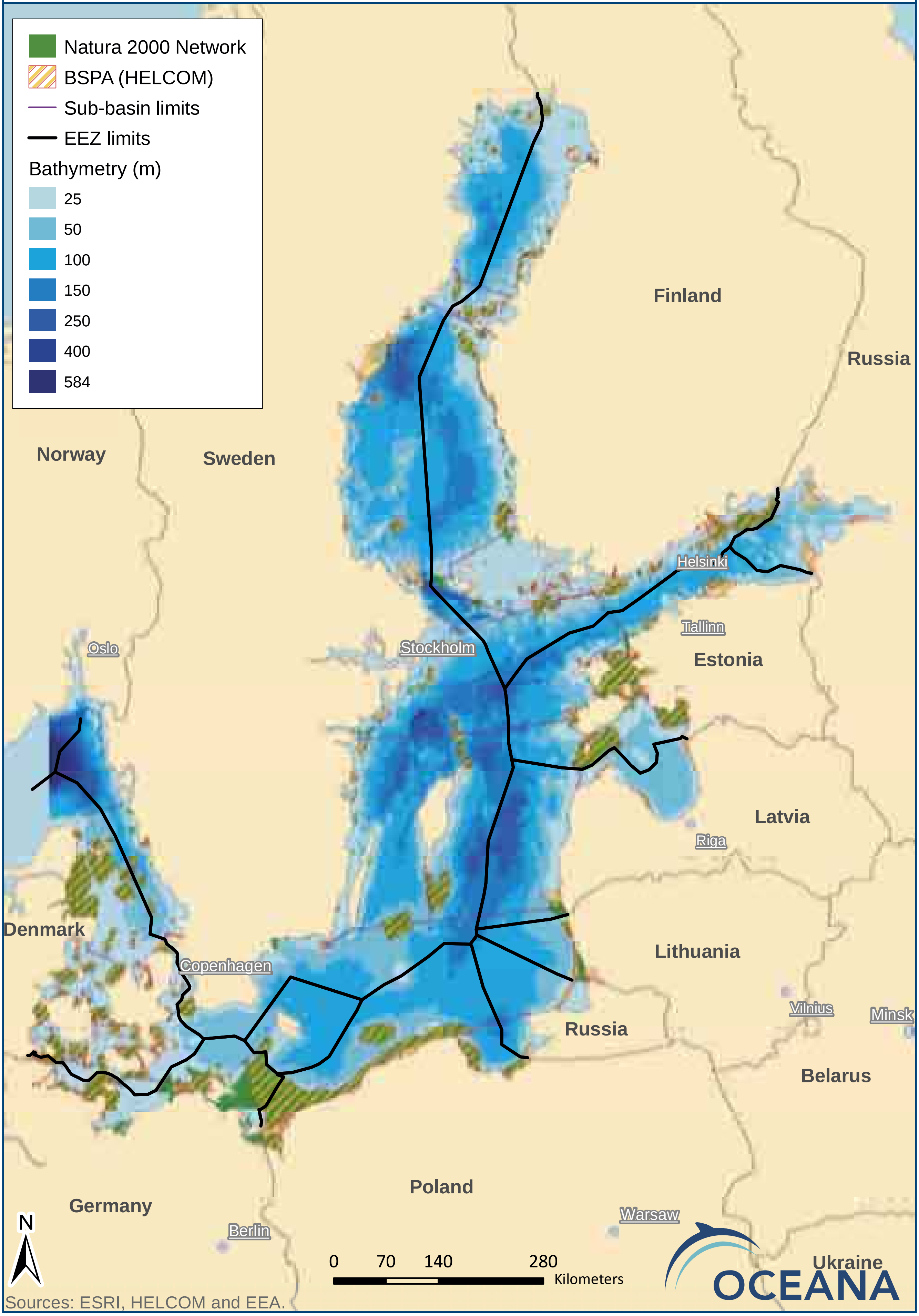
Flatfish at blue mussel bed in Estonian waters.
© OCEANA/ Carlos Suarez

and the degradation of the entire marine ecosystem's health. Due to the multitude of human pressure, observed changes in biodiversity have occurred during the past 30 to 40 years (HELCOM 2009a, HELCOM 2010a). Scientific research shows that the Baltic Sea communities have changed from the lowest level of the food chain to macrophyte communities, benthic invertebrates and to the highest predators, particularly large fish (HELCOM 2009a). Perhaps the most notable regime shift observed in the Baltic Sea pertains to the offshore fish community: while it was previously dominated by predatory cod (*Gadus morhua*), it is now dominated by sprat (*Sprattus sprattus*). These changes are caused by the combined effect of overfishing and natural, climate-related fluctuations (see for instance Cardinale and Svedäng 2011).

The stress factors mentioned above have led to the decline of many Baltic Sea species and habitats. In fact, as identified by HELCOM (2007b), 59 species and 16 habitats are threatened or in decline in the Baltic Sea or its sub-basins. These species include fish, mammals, plants, birds and invertebrates. Among the threatened habitats are macrophyte meadows, reefs, sandbanks and burrowing macrofauna communities.

To safeguard the biodiversity and the ecological processes of the Baltic Sea long term, there needs to be an immediate enlargement of the current network of marine protected areas, in terms of both quantity and quality. The Baltic Sea countries have responded to this by agreeing on the establishment of a well-managed, ecologically coherent network of marine protected areas with first deadline already passed 2010 (HELCOM 2003, HELCOM 2007a). Today roughly 12% of the Baltic Sea is protected with officially designated marine protected areas (HELCOM 2010b, Figure 2) fulfilling the international 10% conservation target set by the World Summit on Sustainable Development (UN WSSD 2002) and the Convention on Biological Diversity (CBD 2004) to world's each marine region. Though the 10% target has been reached for the whole Baltic Sea, countries have contributed area to the network unequally. Also with the exception of Germany, the area located outside territorial waters is poorly protected (Table 1). In addition as studies (Liman *et al.* 2008, HELCOM 2010b) have shown, the current network is lagging far behind it's agreed upon timetable, and the network is insufficient and cannot be considered

Figure 2



Natura 2000 Network
BSPA (HELCOM)
Sub-basin limits
EEZ limits
Bathymetry (m)
25
50
100
150
250
400
584
Finland
Russia
Norway
Sweden
Helsinki
Tallinn
Estonia
Stockholm
Oslo
Latvia
Riga
Denmark
Copenhagen
Lithuania
Vilnius
Minsk
Russia
Belarus
Poland
Germany
Warsaw
Berlin
N
0 70 140 280
Kilometers
Ukraine
OCEANA
Sources: ESRI, HELCOM and EEA.

as ecologically coherent. The existing protected areas network is disconnected, the sites are too small and there is not enough replication of protected features in the network to provide adequate protection. Moreover, the existing areas are mostly located at the coast leaving pelagic and deeper water species and habitats unprotected.

Table 1. Percentage of the area protected by each Baltic Sea country per Territorial Waters (TW), Exclusive Economic Zone outside TW (EEZ-TW) and total of each countries marine area. (Source: HELCOM 2010b)

	Protected marine area (%)		
Country	**TW**	**EEZ-TW**	**Total**
Germany	19.4	54.5	29.7
Poland	54.6	8.6	24.3
Denmark	27.6	8.3	22.1
Estonia	24.0	0.4	16.5
Finland	10.6	0.0	6.8
Lithuania	15.9	0.0	5.6
Sweden	5.9	3.9	4.9
Russia	6.6	0.0	4.6
Latvia	6.7	0.1	3.0

Most of the marine protected areas are included in the EU Natura 2000 and/or the HELCOM Baltic Sea Protected Areas network. The HELCOM MPA network aims to cover specific Baltic Sea features more comprehensively than the EU Natura 2000 network. However, in practice there are no legal consequences when a member state fails to fulfil HELCOM's targets and therefore implementation of HELCOM recommendations is generally poor and the quality standards follow those of the EU Habitats Directive.

Sea anemone (*Sagartiogeton laceratus*), Kattegat, Sweden.© OCEANA/ Carlos Minguell

Management of the protected areas network in the Baltic Sea

In order to enjoy all the benefits of marine protected areas, individual sites and the entire network have to be properly managed. Though the number of protected sites covering larger marine areas has increased over the past years, management is still poor. In the Baltic Sea, management measures have been put in place for only 12% of existing MPAs (see Annex I). Currently, most of the Baltic Sea's MPAs have no management plan in place, meaning that these sites exist only on paper. In addition, many of the existing plans cover only part of a site - at worst, some plans only cover the terrestrial part of the MPA which leaves the marine nature totally unmanaged. Most importantly, fisheries are hardly ever restricted or prohibited inside marine protected areas despite the evidence of several studies that restricting fishing in MPAs has huge advantages for the environment (e.g. Jones 2002, Gell & Roberts 2003, Halpern 2003, Jones *et al.* 2011, Möllmann *et al.* 2009). Annex I includes the list of marine protected areas and their management status.

Diver swimming towards a gillnet entangled to a stone with blue mussels, Germany.
© OCEANA/ Carlos Suarez

Diver stretching a gillnet, Germany. © OCEANA/ Carlos Suarez

Many Baltic Sea countries are now in a phase of transforming their Natura 2000 SCIs (Sites of Community Interest) into SACs (Special Area of Conservation) requiring comprehensive management plans to be enforced and implemented. Thus far there are no marine SACs in the Baltic Sea but the member states are obliged to designate SCIs as an SACs "*as soon as possible and within six years at most*" after they've been approved as SCIs (Anon. 1992).

Oceana urges countries not to delay this process and to proceed with the management plans faster than the set six years requirement. As new information becomes available it is recommended to amend the management plans but lack of information should not be used as an excuse not to manage destructive practices, like fisheries inside MPAs. It should also be ensured that the full range of biodiversity in the area is comprehensively covered and managed, not only as required by the

Habitats Directive, but also in the essence of HELCOM Recommendation 15/5 and the EU MSFD. The status and quality of an area should be observed by a monitoring programme.

Marine protected areas should in general consist of two zones:

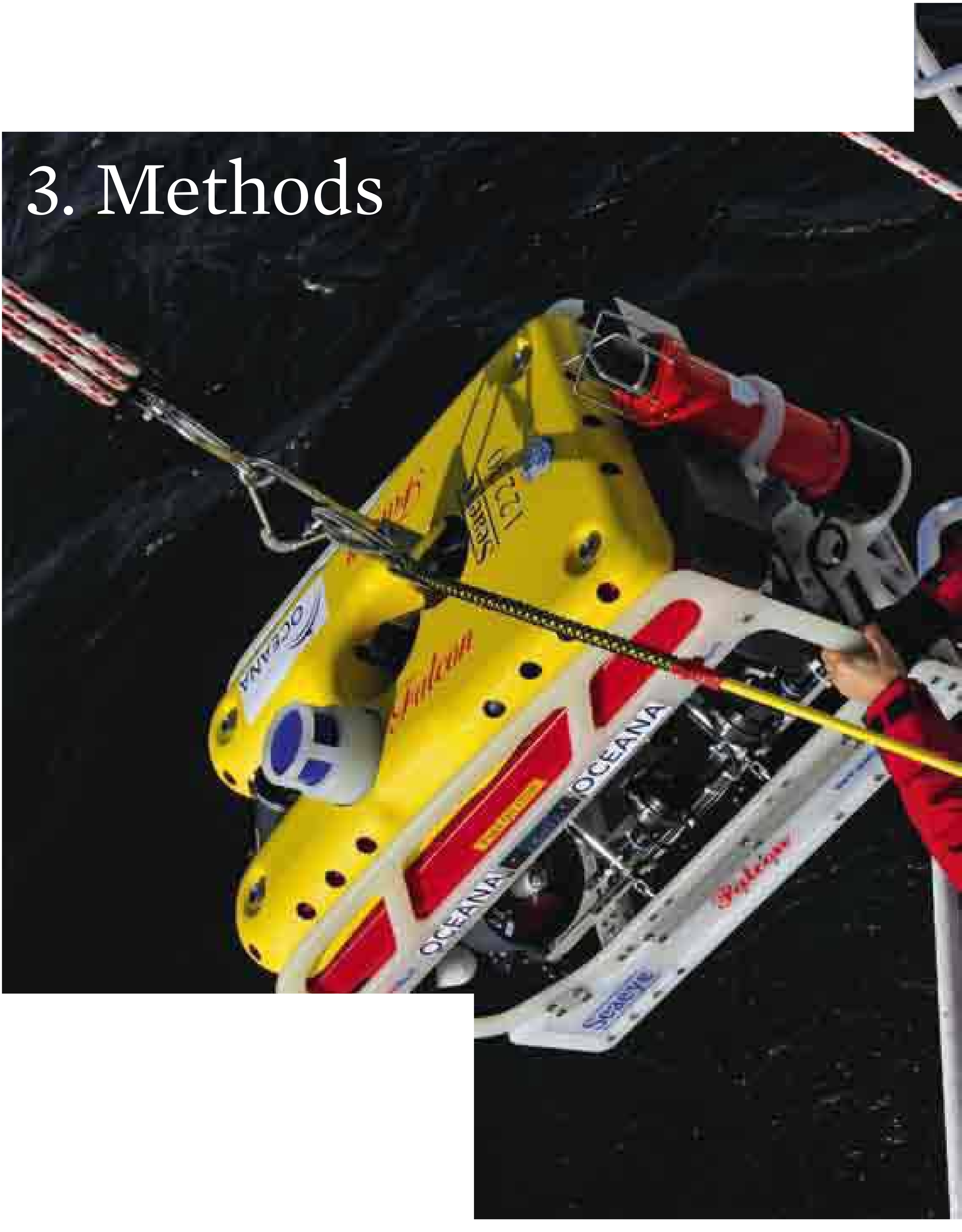
- No take zones: closed for fisheries and all types of human activity except for scientific research activities.
- Buffer zone: in the buffer zone, low-impact activities (artisanal fishing, scuba diving, etc.) could be allowed and closely managed.

No Take zones are expected to give the following benefits as a result of the elimination of fishing:

- Increase of abundance and density of commercial species with reduced mobility
- Increase of average size, especially for long-lived species with slow growth rate and large maximum size.
- Recovery of the shallower areas being more vulnerable to fishing pressure by both recreational and commercial fisheries.
- Improvement of the quality of habitats within the reserve compared to the outside by the removal of disturbing human activities.
- Increase in species size and number with larger migration because of improved habitat quality and abundance of food.
- Contribution to the neighboring areas via spillover effect.

Horse mussels (*Modiolus modiolus*) in the Sound, Sweden. © OCEANA/ Carlos Minguell

3. Methods



ROV hauling maneuver in Kattegat, Sweden. © OCEANA/ Carlos Minguell

Hanse Explorer in the Western Gotland Basin, Sweden. © OCEANA/ Carlos Minguell

Vessel

The vessel used for the Oceana's research expedition in the spring, called the *Hanse Explorer*, is a 48 m certified ice-breaker expedition vessel, built by the German company Fassmer Werft in 2006. Highly suitable for diving expeditions, the boat is equipped with two Zodiacs and other facilities for diving equipment.

The *Hanse Explorer* was crewed by 16 people during Oceana's expedition leaving Copenhagen early April 2011. Oceana's crew consisted of an expedition leader, a research director, two ROV technicians, marine scientists, a UW photographer, a UW videographer, two support divers, and a deck assistant.

During the two month expedition, the *Hanse Explorer* sailed 6.985 nautical miles throughout the Baltic Sea.

Underwater video with ROV

To investigate benthic organisms in their natural environment and to get visual *in situ* recordings of them, a Remotely Operated Vehicle (ROV) was used. The ROV (FALCON DR) is operated by an ROV pilot on board the vessel and can go down to 1,000 meters depth. It was equipped with two cameras, including one with a high definition mode and a zoom of 1:10. The ROV also had a light and a cutting arm for the easy collection of samples. The ROV was slightly limited when recording in water shallower than 20 meters because it was more difficult to manoeuvre.

A cable between the robot and the vessel transferred data directly to a screen where the ROV technicians and marine biologists could observe live recordings. Altogether 94 ROV recordings were made during the expedition at varying depths.

ROV going in the water, Kattegat, Sweden. © OCEANA/ Carlos Minguell

The visual footage recorded by the ROV at the seabed is observed directly in the ROV container on deck, Northern Baltic Proper, Sweden. © OCEANA/ Carlos Minguell

The ROV in the water surface before a dive in the Bothnian Sea. © OCEANA/ Carlos Minguell

Underwater visual recordings

For areas of the Baltic too shallow for the ROV, underwater recordings were done by scuba divers. On each dive, a videographer and a photographer shot the underwater world. An advantage of using human divers is that they can film an interesting spot from different angles and get multiple macro pictures. On the other hand, scuba divers are limited by time due to their use of compressed air. In colder environments, such as in the Gulf of Bothnia, the compressed air is spent even faster. Nevertheless, Oceana completed 40 scuba dives with an average time of nearly 47 minutes per dive.

Divers on the way to a dive spot in Stockholm archipelago. © OCEANA/ Carlos Minguell

Diving in 0° C water north of Gotland, Sweden. © OCEANA/ Carlos Minguell

Sediment sampling

Bottom sampling allowed for the study of the composition of the bottom communities. Benthic macrofauna have an essential role in the ecological processes of the Baltic Sea. Due to the special characteristics of the Baltic Sea, such as young age and low salinity and temperature, only a limited number of macrozoobenthic species were found. Benthic fauna communities are a good indicator of environmental quality. The group itself is very diverse and includes species from practically all major phyla of animals. Apart from Kattegat and the Sound, the usual mix of marine and freshwater organisms was found, but, true brackish water species of benthic fauna were very rare which was expected.

Sediment sample reveals a mud bottom with Macoma community in the Bothnian Sea. © OCEANA/ Carlos Minguell

To investigate epifauna and infauna on the seafloor, a van Veen grab was used to take bottom samplings. The samples were then studied onboard using a Leica-stereo microscope with a digital camera. The penetration of the grab into the sediments might vary in relation to sediment type and time of the year. In the Northern part of the Baltic Sea, near the Bothnian Sea, the low temperatures in April can prevent the use of the van Veen because of frozen sediment.

During the expedition we did 45 dredges from different bottom types, such as mud, sand and mussel beds.

Van Veen grab coming up with a sediment sample, Gulf of Finland. © OCEANA/ Carlos Suarez

4. Baltic Sea species, habitats and communities

Male lumpsucker (*Cyclopterus lumpus*) in Kattegat, Denmark. © OCEANA/ Carlos Minguell

Blue mussels (*Mytilus* sp.) in
the Western Gotland Basin, Sweden.
© OCEANA/ Carlos Minguell

Although a few endemic species (mostly glacial relicts) are known to be from the Baltic Sea, the majority of the sea's species have emigrated from adjacent regions (HELCOM 2009b). There is an overall dramatic reduction in the number of species in the Baltic from south-to-north along the salinity gradient. A particularly steep decrease takes place across the Danish Straits. In the open Skagerrak, there are about 1,600 marine zoobenthic species, but only 500 in the southwestern Baltic Sea, and the decrease continues to less than 20 species in the bottoms of the Bothnian Sea (Bonsdorff 2006). Closer to the coasts and the inner reaches of the Gulf of Finland and the Gulf of Bothnia, the benthic diversity has increased compared to open areas due to the influence of freshwater species and insect larvae. The vegetation changes similarly - the number of macroalgal species drops from about 250 in the Sound area to about 40 in the Bothnian Bay (Nielsen *et al.* 1995). In low salinity areas, the vegetation is made up of salt tolerant or freshwater emergent and submerged plants, as well as the macroalgae species.

The Baltic Sea has a relatively low biodiversity and therefore the maintenance of species diversity is important to its health and survival, and to the overall quality of the environment. It is also critical to the long term functioning of the whole ecosystem. Certain species are of particular importance because they make up forming structures that serve as habitats for many other species. Such key species in the Baltic Sea include: brown algae bladder wrack (*Fucus vesiculosus*), red algae black carrageen (*Furcellaria lumbricalis*), eelgrass (*Zostera marina*), and blue mussels (*Mytilus trossulus* and in Kattegat *M. edulis*). The importance of these species is further highlighted by the Baltic Sea Action Plan (HELCOM 2007a), which states that HELCOM countries will preserve the favourable conservation status of these species and communities. More specifically, that by 2020 "the spatial distribution, abundance and quality of the characteristic habitat-forming species, specific for each Baltic Sea sub-region, extends close to its natural range".

When only a few species are maintaining many functions of an ecosystem, as is the case in the Baltic Sea, the system is characterized with low resilience, referring to the capacity of an ecosystem to respond to a perturbation or disturbance and ability to recover after these events (HELCOM 2009b). Hence, when designating protected areas it is essential to include physical features and large marine landscapes that are known to support key species.

Shell gravel in the Bothnian Sea, Sweden.
© OCEANA/ Carlos Minguell

Classification of habitats and communities

In the Baltic Sea region, one of the first initiatives to develop an internationally agreed upon classification system was initiated by HELCOM. As a result, the Red List of Marine and Coastal Biotopes and Biotope Complexes of the Baltic Sea was published in 1998. However, this list didn't sufficiently detail the complexity of the Baltic Sea. Attempts to up-date the list are currently ongoing with help from organizations like Oceana. The most recent HELCOM List (HELCOM 2007) includes the following marine habitat/biotope types:

(1) Offshore (deep) waters below the halocline,
(2) Shell gravel bottoms,
(3) Sea grass beds,
(4) Macrophyte meadows and beds,
(5) Gravel bottoms with *Ophelia* species,
(6) Sandbanks,
(7) Reefs,
(8) Bubbling reefs,
(9) Maerl beds, and
(10) Sea pens with burrowing megafauna.

On the European Union scale, an overall classification system is offered by the European Environmental Agency (EEA) as a part of the European Union Nature Information System (EUNIS). To date, it has been broad and insufficient in describing the local conditions of the Baltic Sea. The EUNIS classification for the Baltic Sea as it appears at the time of writing is included in Annex II. However, the system is being updated, thus offering a possibility to integrate regional specifics. In the Annex II proposals for descriptions of some habitats/communities is given based on our observations.

In 1992, the European Commission also adopted a list of the most vulnerable habitat types to be protected within the EU (Annex I of the Habitats Directive). This list includes three marine habitat types represented in the Baltic Sea - reefs, bubbling reefs and sandbanks - as well as coastal habitats like lagoons, estuaries, large shallow inlets, bays, mudflats and sand flats not covered by sea water all the time. However, this list focuses only on a few habitat types of special protection interest and does not provide an overall classification system.

Communities are made of species within an ecosystem. A community's composition influences the processes of productivity, stability, and interactions within the food web/entire ecosystem. The communities described in this chapter are mainly the ones we documented in the course of our expedition, but we also included the kind of communities that are key to the functioning of the Baltic Sea. Changes in these communities inevitably affect all the other components of Baltic Sea biodiversity.

Grey seal (*Halichoerus grypus*), Bothnian Sea, Sweden. © OCEANA/ Carlos Minguell

Pelagic, offshore (deep) waters

The offshore, deep waters in the Baltic Sea include the water body of the open sea area deeper than 15-25 m (HELCOM 1998). These pelagic waters are inhabited by plankton, larvae of benthic animals, fish eggs, fish larvae, holoplankton and jellyfish. Primary production takes place mostly in the waters above halocline. Waters below the halocline are affected by oxygen deficiency, which is common in many parts of the Baltic Sea. The oxygen content of the water generally decreases with increasing depth while salinity also increases with depth. The salinity and oxygen levels of the upper parts of the deep layer greatly impact the survival of planktonic organisms. Cod eggs, for example, are spawned above the halocline and only if the salinity is 10 psu or higher can the eggs be prevented from sinking to depths below the halocline where oxygen levels are too low for survival. HELCOM has listed the Baltic's pelagic offshore deep waters as threatened (HELCOM 2007).

Benthic habitats and communities

4.1 REEFS | Reef areas rise from the sea bottom and have a hard structure. There are different types of reefs, but all sustain a high diversity of fish, invertebrates, plants and birds. Reefs may be of biological (e.g. coral reefs) or geological origin. Those in the Baltic Sea formed mainly on stony bottoms, boulders and rocks. Compact sessile mussel beds of the hydrolittoral and sublittoral are also considered reefs (see sections 4.1.1 and 4.1.2). Moreover, reef structures can also be formed by leaking gasses (see section 4.2).

In the Baltic Sea most reefs range between 2-20 meters in depth. Typically, reef tops host diverse communities of red, brown and green macroalgae and other plants (see section 4.4). Animals, like soft corals, sea anemones, bivalves, hydroids, ascidians, barnacles, bryozoans and molluscs, are also attached to the reef. There are huge variations in the species composition of reefs in Kattegat compared to reefs in the northern parts of the Sea, which is mainly due to the decreasing salinity. The reef environment includes mobile animals too, such as crustaceans and fish like edible crab (*Cancer pagurus*) and cod (*Gadus morhua*). Reefs are hot spots for biodiversity in the Baltic Sea (HELCOM 1998).

Edible crab (*Cancer pagurus*) in Kattegat, Sweden. © OCEANA/ Carlos Minguell

Eelpout (*Zoarces viviparus*), Estonia. © OCEANA/ Carlos Suarez

Blue mussels (*Mytilus* sp.) with attached barnacles and bryozoan, the Bothnian Sea, Finland. © OCEANA/ Carlos Suarez

Reefs form important spawning and feeding grounds for many of the commercially important fish species. Different types of reefs also provide feeding areas for diving birds who feed on molluscs and crustaceans. Thus, reefs play a significant role in the whole food chain.

All reef sub-types throughout the Baltic Sea are classified as "Endangered," but the reefs in the southern Baltic are particularly threatened (HELCOM 1998, HELCOM 2007). Human activities, like construction, dumping, pollution, fishing, and mineral extraction, are the main threat to reefs because they increase environmental pressure and result in physically severe damages.

4.1.1 *MYTILUS* BEDS | Blue mussels are the main colony forming species in the Baltic Sea. There are two types of blue mussels in the Baltic Sea: *Mytilus edulis* which is a North Atlantic species that can be found in Kattegat, and *Mytilus trossulus* which dominates the rest of the Baltic Sea. These species are found in high abundance from the shallow, hard substrates to the sea's deeper areas (usually up to 30 meters). They dominate the animal biomass on hard substrates and are considered to be one of the key functioning species in the Baltic Proper (HELCOM 2009b). As in the case of *Modiolus* beds (see section 4.1.2), *Mytilus* beds host a number of other species like different species of barnacles, hydroids and bryozoa living on or within the molluscs. Also different types of fish, like *Myoxocephalus scorpius* and *Pholis gunnellus* live and feed on these beds.

The blue mussel is considered to be an important link between the benthic and pelagic components of the Baltic Sea ecosystem. It plays an important role in channelling the flow of energy and matter through filtering annually an amount of water corresponding to the volume of the entire Baltic Sea (Kautsky & Kautsky 2000).

4.1.2 *MODIOLUS* BEDS | Horse mussel (*Modiolus modiolus*) beds can be found from in range of substrata from cobblestones to muddy gravel to sand seabed; therefore, it is not a strict hard-bottom inhabitant. Particularly in softer bottom areas horse mussel beds have a stabilising effect to the seabed (OSPAR Commission 2008). A horse mussel is a marine, Arctic-Boreal species that lives in the Sound and in Kattegat. The mussels can form dense beds at depths from over 100 meters, but usually reside in shallower areas. *Modiolus* beds attract a range of species which attach to the top of its shell, like sea anemones (*Metridium senile*), bryozoans (*Electra crustulenta*) and hydroids (*Obelia geniculata*). Together with the *Haploops* community (see section 4.5.4), the *Modiolus* community is the most distinctive in the Sound and supports a wide variety of other species (Göransson & Bertilsson 2010).

Modiolus bed, the Sound, Sweden. © OCEANA/ Carlos Minguell

The horse mussel is particularly sensitive to human disturbance since it grows slowly and doesn't reach sexual maturity until 5 to 6 years. It is assumed that *Modiolus* beds used to be more common in Kattegat, but because of destructive fishing practices (bottom trawling) these beds have now mostly disappeared (Michael Olesen, pers. comm.). During the past few decades, a decrease in horse mussels has also happened in the Sound, even though bottom trawling has been banned there since 1932 (Göransson & Bertillosson 2010). Besides seabed trawling, other threats to *Modiolus* beds include the extension of harbours, dumping, dredge tipping, the emission of pollutants, and a lack of oxygen in the bottom water (Göransson & Bertilsson 2010). *Modiolus* beds in Kattegat are listed as threatened and/or declining by OSPAR.

4.2 SUBMARINE STRUCTURES MADE BY LEAKING GASES |

4.2.1 BUBBLING REEFS AND GAS SEEPAGES | Bubbling reefs are submarine structures consisting of sandstone slabs, pavements, and pillars that can be up to 4 m high. They are formed by the aggregation of carbonate cement and other particles resulting from microbial oxidation of gas emissions, mainly methane. These formations maintain gas vents that sporadically release gas (HELCOM 1998). The methane most likely originates from the microbial decomposition of fossil plant materials and formations which date dating back thousands of years back in time. Many species currently live and seek shelter in the "chimneys" of the pillars. Bubbling reefs support diverse benthic communities consisting of algae and/or invertebrate specialists of hard marine substrates different than that of the surrounding habitat. Species living in the bubbling reefs include: dead men's fingers (*Alcyonium digitatum*), hydroids (*Tubularia larynx*, *Eudendrium* sp.), crustaceans (*Balanus* sp.), worms (*Cirratulus incertus*, *Polydora* sp.), and many species of fish, like lumpsucker (*Cyclopterus lumpus*), striped seasnail (*Liparis liparis*), gobiids, etc.

Bubbling reef with kelps and other sea weeds, Kattegat, Denmark. © OCEANA/ Carlos Minguell

Bubbles escaping from the sea bottom in Kattegat, Denmark. © OCEANA/ Carlos Minguell

Bubbling reef forming spectacular shapes, Kattegat, Denmark. © OCEANA/ Carlos Minguell

Bubbling reefs can be found in Kattegat from the littoral to the sub-littoral zone - 0 to 30 m below the surface. They can also be found in some locations in the North Sea (HELCOM 1998). They are unique formations, even world-wide, and are under threat where they occur (HELCOM 2007). Due to their rarity, bubbling reefs are classified as "potentially endangered" (HELCOM 1998). The main threats include pollution, fishing, tourism and recreational activities (e.g. diving).

4.2.2 POCKMARKS | Pockmarks are another type of carbonate structures made out of leaking gasses. They are found in many areas of the European shelf seas. Pockmarks are depressions in the soft sediment seabed areas, and can be 45 m deep and a few hundred meters wide. Some pockmarks are not formed by leaking gas and do not contain substantial carbonate structures; therefore, these not included in this habitat type.

Benthic communities associated to pockmarks consist of invertebrates specialised on hard marine substrata (like *Hydrozoa, Anthozoa,* Ophiuroidea and Gastropoda), and are different from the surrounding (usually) muddy habitat. The diversity of the infauna community in the muddy slope surrounding the "pockmark" may also be high; Nematodae, Polychaeta and Crustacea are typically present (European Commission 2007).

Flounder (*Platichthys flesus*) hiding under sand at Oderbank, Poland. © OCEANA/ Carlos Suarez

The exact extent of the pockmarks in the Baltic Sea is not known, but pockmarks can be found at least from the southern Baltic Sea. Likewise their threat status is not known either. However, all EU member states are (according to EU legislation) obliged to carry-out assessments on the status of pockmarks and take all appropriate steps to avoid further deterioration of all submarine structures made by leaking gases. This includes protection measures within the Natura 2000 network, and guaranteeing its favourable conservation status. (European Commission 2007).

4.3 SANDBANKS | Submerged sandbanks, as the name implies, are related to underwater sandy bottoms. This habitat type is typical of shallow coastal waters and raised parts of the sea bottom (up to 20 m depth) in the deeper waters. They are widely spread throughout the Baltic Sea. Sandbanks are listed as “Endangered” through-out the Baltic Sea (HELCOM-2007). They are particularly threatened and/or declining in the southern Baltic Sea area. The main threats to sandbanks include eutrophication, fisheries (e.g. bottom trawling), mineral extraction, offshore constructions, dredging and dumping of dredged material.

Common starfish (*Asterias rubens*) on a sand bottom in Kiel Bay, Germany. © OCEANA/ Carlos Suarez

From the constant exposure to waves, sandbanks in coastal areas have usually no vegetation - the sand is washed there continuously, as in a washing machine. Common animals are those that can burrow into the sand, like some species of mussels, worms, crustaceans etc. Sandbanks in more sheltered areas form rich communities and are characterized by different plant species, like *Zostera* sp. (see section 4.4.4), *Ruppia maritima Potamogeton* sp. or Charophytes (see section 4.4.3).

Sandbanks are considered to be of Baltic-wide importance because they serve as important fish spawning grounds, and as feeding and wintering areas for water birds. They also host rare, threatened and/or declining benthic species and communities. Sandbanks are also an important regeneration and re-colonization reservoir after catastrophic oxygen depletion events in deep areas (HELCOM-1998).

4.4 MACROPHYTE MEADOWS AND BEDS | Macrophyte meadows and beds occur on soft and hard bottoms throughout the Baltic Sea. In the Baltic Sea, hard bottom communities consists mainly of macroalgae, sea grass and water moss species. Macroalgae (green, brown and red algae, see sections 4.4.1 and 4.4.2) are among the most typical flora. There are 442 macroalgae species in the Baltic Sea (Nielsen *et al.* 1995). Stony bottoms and different kinds of reefs and sandbanks (see sections 4.1, 4.2 and 4.3) are preferred by large macroalgae. The distribution of green, brown and red algae is related to the availability of light. Green algae tend to be the most abundant in shallower waters, brown algae are found in both shallow and deeper parts, and red algae are plentiful in deeper regions.

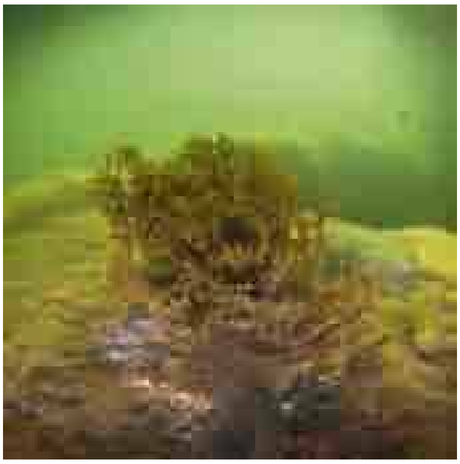
Macroalgae on stones with mussel bed, the Sound, Sweden. © OCEANA/ Carlos Suarez

Vegetated soft bottom communities have an equally important role in coastal ecosystems, and are wide spread in the northern Baltic Sea in shallow waters. These communities are often dominated by phanerogams, like pondweeds (*Potamogeton* spp., *Zannichellia palustris*) or charophytes (see section 4.4.3), and they provide important feeding and nursery areas for several fish and bird species. (Appelgren & Mattila 2005, Herkul *et al.* 2011)

In the Baltic Sea, the exact status of the threatened macrophyte meadows is not known, but HELCOM (1998, 2007) has classified this biotope as threatened and declining because many species have not been found as deep from the shore as before. Also, in some areas, a decrease in the number of taxa has been observed compared to historical recordings (Bäck *et al.* 2002). Macrophyte meadows are mainly threatened by eutrophication that causes reduced light penetration, and increased growth of filamentous algae which covers and suffocates the macrophyte meadows. Other threats include pollution and physical habitat destruction, like sand and gravel extraction.

4.4.1 MACROALGAE COMMUNITIES | Brown perennial macroalgae usually grow between 1-6 meters below the surface on hard, rocky bottoms. They form one the most species-rich ecosystems in the Baltic Sea. The bladder wrack (*Fucus vesiculosus*), which is widely distributed along coastal areas, is often characterized as the most important of all phytobenthic species in the Baltic Sea because it provides habitats for many epiphytic and epibenthic communities (Kautsky & Kautsky 1989). Fluctuations in the distribution and abundance of this species can have huge effects on the status of coastal ecosystems (HELCOM 2009b). The distribution of bladder wrack covers the Baltic Sea up into the Gulf of Bothnia in north and the Gulf of Finland in the east where it reaches its salinity tolerance limit (approximately 4 psu). In the past, bladder wrack was the dominant algal species in the shallow waters of the Baltic Sea. Since the 1940s, there has been a decrease in the abundance of *F. vesiculosus* for several reasons (Kautsky *et al.* 1986). The contributors to the decline are: eutrophication (which has reduced light penetration to bladder wrack), competition with filamentous algae, and the impact from ice scraping and shading (Goecker & Kåll 2003).

Red algae communities are found below the depths of brown algae, usually between 5-15 meters deep. As with brown algae, red algae cannot tolerate low salinity levels (apart from some brackish water species), and its distribution is limited to the approximate 4 psu salinity limit. The four most common red algae in the Baltic Sea are the black carrageen (*Furcellaria lumbricalis*), *Ceramium tenuicorne*, *Coccotylus truncatus* and stalked leaf bearer (*Phyllophora pseudoceranoïdes*). The red algae zone is also rich in species and provides habitats for sea creatures, like shrimps, blue mussels (*Mytilus trossulus* and *M. edulis*), and barnacles (*Balanus* spp.).



Bladder wrack (*Fucus vesiculosus*) in the northern part of the Bothnian Sea, Finland. © OCEANA/ Carlos Suarez

Macroalgae and blue mussels (*Mytilus* sp.) attached to rocks in the Northern Baltic Proper, Sweden. © OCEANA/ Carlos Minguell

The perennial black carrageen is one of the keystone species in the Baltic; it offers important habitats for many species. For example, plenty of other brown and red algae grow as epiphytes on black carrageen. Black carrageen is found on the sandy bottoms where it may form dense belts with other red algae. It is also the most important macroalgae in the exposed coastal waters of Lithuania and Latvia in the Baltic Proper, where bladder wrack is unable to grow. Many fish species, particularly the Baltic herring (*Clupea harengus membrans*), use this community as spawning grounds (Bucas *et al.* 2007).

During the past decades, significant changes have been observed in distribution of many macroalgae species along the depth gradient. For example, *Fucus vesiculosus* was recorded at 8-10 meters deep in the Finnish Tvärminne archipelago in the 1930s and the 1970s, but only at 5 meters deep in 1994. Some species also disappeared from areas where they had been observed before, like *Chorda filum* which disappeared from the inner Puck Bay in Poland in the mid-1970s (Bäck *et al.* 2002). All macroalgae communities are considered to be threatened and declining, although the exact, current status of the species is unknown.

4.4.2 KELP | The diversity of macroalgae is much higher in the southern parts of the Baltic Sea, where there are several algal species that require higher salinities for survival, such as kelps. The main species that create kelp forests in the Baltic Sea are oarweed (*Laminaria digitata*) and sugar kelp (*Laminaria saccharina*). Sugar kelp can be found only in Kattegat, while oarweed can be found in the Bornholm waters in the Baltic Proper. These brown algae form an important home for large communities of other algae, including green algae *Chaetomorpha melagonium* and sea beech (red algae *Delesseria sanguinea*). Many other species live in the kelp canopy, like hydrozoans (*Clava multicornis*, *Obelia geniculata*), bryozoans (like *Electra pilosa*) and sea snails (*Hydrobia* spp., *Rissoa* spp.). Kelp forests are also important habitats for many fish, like goldsinny-wrasse (*Ctenolabrus rupestris*) and two-spotted goby (*Gobisculus flavescens*) (e.g. Køie *et al.* 2000).

Oarweed (*Laminaria digitata*) in Kattegat, Sweden. © OCEANA/ Carlos Minguell

Sugar kelp (*Laminaria saccharina*) in Kattegat, Denmark. © OCEANA/ Carlos Minguell

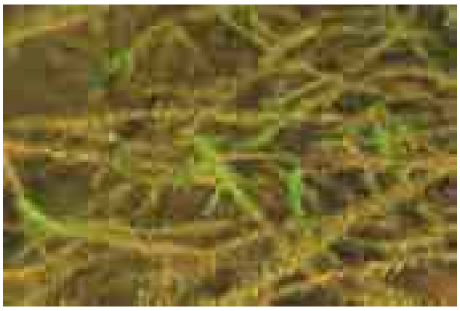
4.4.3 *CHARA* MEADOWS | Charophytes are macroalgae that dominate the soft bottoms in shallow areas of the Baltic Sea where light is easily available (Mathieson & Nienhuis 1991). Because they can survive in fresh- and brackish-water environments, charophytes are found in particular high numbers from the easternmost and northernmost areas of the Baltic Sea. Due to their requirement for clear water, they are considered a good indicator of water quality (Torn *et al.* 2004). Throughout the past decades, the number of species, its distribution, as well as total biomass, has significantly declined in the Baltic Sea (Schubert & Blindow 2003). A particularly serious decline has taken place in the coastal waters of the Schleswig-Holstein in Germany, along the Swedish west coast, and the coastal waters of Hanko peninsula in Finland (Shubert & Blindow 2003). The deterioration is mainly from mechanical stress, combined with the destruction of habitats caused by human-induced pressures, such as eutrophication (HELCOM 2009b).

4.4.4 SEA GRASS MEADOWS | Eelgrass (*Zostera marina*) and dwarf eelgrass (*Zostera noltii*) are vascular plants that form sea grass meadows in the Baltic Sea. Eelgrass beds occur south of the Bothnian Sea, whereas dwarf eelgrass beds are restricted to the southern and south-western parts of the Baltic Sea, including Kattegat. Seagrass beds are among the most threatened marine biotopes in the Baltic Sea area. HELCOM (1998, 2007) has classified seagrass beds as heavily endangered - under the biotope type level sandy bottoms dominated by macrophyte vegetation.

Male and female amphipods (*Gammarus* sp.), Bothnian Sea, Sweden. © OCEANA/ Carlos Minguell

In the Baltic Sea, seagrass beds are usually found between 1-8 meters deep on exposed sandy bottoms with a minimum salinity of 5 psu (e.g. Boström *et al.* 2002, 2004). In the optimal environment, these meadows can cover tens of hectares (Boström *et al.* 2003). Particularly in its northern range eelgrass meadows grow as a complex with many other vascular plants, such as wigeongrass (*Ruppia maritima*), spiked water milfoil (*Myriophyllum spicatum*), and charophytes (like *Tolypella nidifica* and *Chara aspera*). Numerous benthic animals are also dependent on the shelter created by eelgrass meadows, including Oligochaetas, Polychaetas (such as *Hediste diversicolor*), mudshrimp (*Corophium volutator*) and Baltic clam (*Macoma balthica*). In addition, several epifauna live in between the canopy of seagrass meadows, like cockles (*Cerastoderma glaucum* and *Parvicardium hauniense*), brackish water snails (*Hydrobia* spp.), gammarid amphipods (*Gammarus* spp.), isopod crustaceans (*Idotea* spp.), pipefish (*Syngnathus typhle*, *Nerophis ophidion*) and sea slugs (*Embletonia pallida*, *Limapontia capitata*) (e.g. Boström *et al.* 2002).

Common eelgrass (*Zostera marina*), the Sound, Sweden. © OCEANA/ Carlos Minguell



Willow moss (*Fontinalis antipyretica*), Bothnian Bay, Sweden. © OCEANA/ Carlos Minguell

4.4.5 WATER MOSS | The majority of water mosses (Bryopsia) are fresh water species. In the Baltic Sea, water moss communities are particularly common in the northern parts of the sea between 3-5 meters deep. They inhabit similar substrates as bladder wrack: solid rock and boulder bottoms. Usually, water mosses are found together with other species of algae and vascular plants, like pondweed (*Potamogeton perfoliatus*). Most of the species found in the Baltic belong to the genus *Fontinalis* (Koponen *et al.* 1995, Bergström & Bergström 1999).

4.5 SOFT BOTTOM COMMUNITIES | Soft bottom communities are usually defined by the characteristic association of animals, and named after the most conspicuous components of the community. Soft bottom communities inhabit littoral and sublittoral mud and sand flats, muddy gravel, and deep water mud habitats. An available description for some of these communities is sparse on detail due to a lack of comprehensive data but an overview of the major Baltic Sea communities is given here. Generally these communities support a wide range of other species and provide an important food source for many fish and bird species (UK BAP). The main threats in the Baltic Sea include eutrophication, fisheries (particularly bottom trawling), other physical disturbances (dredging), and the accumulation of harmful substances.

Queen Scallop (*Aequipecten opercularis*) and phosphorescent sea pen (*Pennatula phosphorea*), Kattegat, Denmark. © OCEANA

Baltic tellin (*Macoma balthica*) from the Bothnian Bay, Sweden. © OCEANA/ Carlos Minguell

4.5.1 *MACOMA* COMMUNITY | Benthic animals living in mud, or mixed sand-mud bottoms, down to approximately 10 meters, form the so-called *Macoma* community, named after the Baltic tellin (*Macoma balthica*) which is wide spread in shallow areas along the west coast and in the Baltic. Other species associated with this community include other species of clams, like sand gaper (*Mya arenaria*), common and lagoon cockles (*Cerastoderma edule* and *C. glaucum*); worms, such as lugworm (*Arenicola marina*), fanworm (*Fabricia sabella*), catworms (*Nephtys caeca*), bristle worms (*Pygospio elegans*, *Scoloplos armiger*, *Capitella capitata*). The *Macoma* community also attracts a number of species living above the sea bottom, like laver spire shells (*Hydrobia ulvae*), scuds (*Bathyporeia pilosa*), blue mussels (*Mytilus edulis* and *M. trossulus*) and flatfish, like flounders (*Platichthys flesus*). (The Sound Water Cooperation)

4.5.2 *ABRA* COMMUNITY | Another type of soft bottom community is named after the white furrow shell (*Abra alba*). This community is found in shallow, mixed muddy/sand bottoms, often in sheltered inlets or bays up to 15 meters in depth. The furrow shell is a marine species; therefore, it can mainly be found in Kattegat, the Belt Seas, the Sound, and some stretches of the Western Baltic Sea. Species associated with this community include the prismatic furrow shell (*A. prismatica*), astartes (*Tridonta* spp.), sea potatoes (*Echinocardium cordatum*), bristle worms (such as *Terebellides stroemi*, *Rhodine gracilior*, *Nephtys ciliate*, *Scoloplos armiger*), Iceland mussel (*Arctica islandica*). The community also provides resources for non-burrowing species such as pointed cingula (*Onoba aculeus*), shrimps (*Diastylis rathkei*), and flatfish, like plaice (*Pleuronectes platessa*). (The Sound Water Cooperation)

4.5.3 ECHINODERMS | Echinoderms include several animal families such as starfish, brittle stars, sea lilies, sea urchins and sea cucumbers (Køie & Kristensen 2000). Echinoderms are abundant in the western part of the Baltic Sea, from Kattegat to the western part of the Southern Baltic proper, where there the salinity is higher compared to the inner Baltic Sea. Therefore, echinoderms are missing in the northern part of the Baltic Sea (Bonsdorff 2006, Køie & Kristensen 2000). Starfish, such as the common starfish *Asterias rubens*, are predators to mussels and clams, and have the fantastic ability to regenerate (Naylor 2011). In the Great Belt in Denmark, *Echinocyamus pusillus* is the second dominating species in number of individuals, after the small amphipod *Corophium crassicorne*. Among other species living here are mussels (*Corbula gibba* and *Parvicardium ovale*), crustaceans (*Microdeutopus gryllotalpa* and *Bathyporeia pilosa*) and polychaets (*Scoloplos armiger* and *Ophelia borealis*) (DHI 2008). As predators, echinoderms have an important top-down role in a sea community. Prey selectivity is seen; for example, with small sea stars who are limited by their size and can only prey on species not too big for them, e.g. the snail *Hydrobia ulvae*. *A. rubens,* on the other hand, can eat many kinds of prey and is therefore considered a competitor of demersal fish in soft bottoms in the western Baltic Sea (Anger *et al.* 1977).

Echinoderms (*Psammechinus miliaris, Ophiura ophiura*) and sea anemones (*Metridium senile*), the Sound, Sweden. © OCEANA

Common sunstar (*Crossaster papposus*) with dead man's fingers (*Alcyonium digitatum*) and sea anemones (*Metridium senile*), the Sound, Sweden. © OCEANA

Common starfish (*Asterias rubens*), Kattegat, Sweden. © OCEANA/ Carlos Minguell

Hermit crab (*Pagurus bernhardus*), Kattegat, Denmark. © OCEANA/ Carlos Minguell

Kattegat and the Sound are inhabited by three different types of brittle star aggregations. *Amphiura chiajei* is found in soft bottoms formed by a mixture of clay and mud; *Ophiura albida* communities are found in sandy-muddy bottoms; and the third type of community consists of three species of brittle stars: *Ophiopholis aculeate*, *Ophiocomina nigra* and *Ophiothrix fragilis* which are found around or on the hard bottom.

The soft bottom brittle star community shares space with hermit crabs (*Pagurus bernhardus*), flatfish and different species of shellfish (*Ensis americanus*, *Cerastoderma edulis*, *Spisula* sp., etc.), while brittle stars in hard bottoms share the space with communities associated with boulders. Brittle star communities are important feeding grounds for many flatfish, like dab (*Limanda limanda*) and sole (*Solea solea*). (The Sound Water Cooperation)

4.5.4 *HAPLOOPS* COMMUNITIES | *Haploops* communities are formed by crustacean amphipods (*Haploops tubicola* and *H. tenuis*) that live inside tubes in the deep, firm mud bottoms of Kattegat, the Great Belt and, particularly, the Sound. *Haploops* communities also occur in the Skagerrak and the North Sea. The communities are found 25 meters below the surface and deeper (Göransson *et al*. 2010).

Haploops community in the deeps of the Kattegat, Denmark. © OCEANA

Dense *Haploops* communities form feeding grounds for many commercially important fish species, like plaice and halibut (*Pleuronectes platessa*, *Reinhardtius hippoglossoides*). Tube worms (*Sabella penicillus*), sea urchins (*Brissopsis lyrifera*) and brittle stars (*Ophiura robusta*) are also commonly found. Recent studies in the Sound show that there has been a significant decline in the abundance of this community, which is now at a tenth of its former distribution. According to regular sampling in the Sound, the community is still declining and the only stable populations seem to be in a restricted area north of the island Ven. The biggest threats include eutrophication, fishing, ecosystem changes and increased water temperature (Göransson *et al*. 2010).

4.5.5 TUBE WORM COMMUNITIES | Tube worm communities are similar to *Haploops* communities, but are built by polychaete worms living in tubes in soft bottoms, like *Polydora ciliata*, *Pygospio elegans*, *Sabella penicillus* and *Lanice conchilega*. On harder substrates, *Sabellaria spinulosa* can form dense aggregations. Tube dwelling polychaetes are especially common in Kattegat and the southern Baltic Sea, but some are also found in the more northern parts of the Baltic Sea. In areas where tube worm density is high, the worms modify their immediate environment. They alter sediment properties, offering shelter for other species, and provide a settlement surface for larvae and other small organisms (Callaway 2006). Small crustaceans, like amphipods, are commonly associated to these communities, but larger fauna, like sea anemones, crabs (*Carcinus maenas*, *Cancer pagurus*, etc.) and different kinds of fish are also standard. Often *Haploops* and tubeworm communities are mixed.

Sand-mason worm (*Lanice conchilega*), Kattegat, Denmark. © OCEANA/ Carlos Minguell

Threats to this community are presumably the same as to *Haploops* community, including eutrophication, fishing and ecosystem changes.

The endemic isopod *Saduria entomon*, Estonia.
© OCEANA/ Carlos Minguell

4.5.6 *SADURIA* COMMUNITY | The isopod *Saduria entomon* is one of the largest crustaceans in the Baltic Sea, with the biggest individuals measuring up to 7 cm in length (Køie & Kristiansen 2000). It is considered to be an ice age relict. The isopod is an omnivore, behaving as both a scavenger (eating dead fish for instance) and a predator (mainly on *Macoma balthica* and *Monoporeia affinis*). *S. entomon* has few competitors for food and can live at different depths, from shallow water to areas as deep as over 290 m. Therefore it is considered as an important community regulator (Sandberg & Bonsdorff 1990, Ejdung & Bonsdorff 1992). The isopod is as well an important food supply for different fish species, such as cod (*Gadus morhus*) and fourhorn sculpin (*Myoxocephalus quadricornis*) (Sandberg & Bonsdorff 1990, Køie & Kristiansen 2000). *Saduria entomon* is found in different types of seabeds, including mud and sand beds, where its characteristic tracks can cover a whole mud bottom. *Saduria entomon* is listed as threatened and/or declining in the Southern Baltic Proper (HELCOM 2007).

4.5.7 *MONOPOREIA* COMMUNITY | *Monoporeia affinis* (also known as *Pontoporeia affinis*) is a small amphipod, measuring only up to 1 cm in length, which can live in both brackish and limnic water. It has a circadian cycle, where it lives buried in the mud sediment during the day, and swims around at night (Donner *et al.* 1987, Køie & Kristiansen 2000). *M. affinis* is found in most parts of the Baltic Sea, such as the Archipelago Sea and the Bothnian Bay, and generally in deeper waters below 20 meters (Bonsdorff *et al.* 2003, Donner *et al.* 1987). The *M. affinis* community has a relatively high diversity of species (Bonsdorff *et al.* 2003), but some offshore, deep communities have a lower diversity. The most important factors for the welfare of *M. affinis* are high oxygen concentrations and good food supply; the latter consists of detritus and algae (Bonsdorff *et al.* 2003, Donner *et al.* 1987). Several fish species feed on the amphipod, such as cod (*Gadus morhua*), herring (*Clupea harengus*), smelt (*Osmerus eperlanus*), and fourhorn sculpin (*Myoxocephalus quadricornis*) (Donner *et al.* 1987). *Monoporeia affinis* is listed as threatened and/or declining in the Gulfs of Finland and Riga, as well as in the Northern and Southern Baltic Proper (HELCOM 2007).

The Baltic amphipod (*Monoporeia affinis*).
© OCEANA

4.5.8 SEA PENS WITH BURROWING MEGAFAUNA | This community is characterized by plains of fine mud in deeper waters that are heavily mixed by burrowing megafauna, which typically form a prominent sediment surface feature that creates a complex habitat, providing oxygen penetration to the sediment (OSPAR 2008). In the Baltic Sea, the most common sea pens are slender sea pens (*Virgularia mirabilis*) in deeper waters, and phosphorescent sea pens (*Pennatula phosphorea*) in shallower waters. Tube anemones (*Pachycerianthus multiplicatus*), burrowing crustaceans (like *Nephrops norvegicus*) and flatfish are also commonly present in these communities.

This community is found below 15 meters deep, occurring only in full marine conditions (salinity >30 psu). Therefore, in the Baltic Sea, this community is found only in the deeper parts of Kattegat. Sea pens and burrowing megafauna are very vulnerable to bottom trawling because bottom touching gear extensively disturbers the environment in terms of area and quality (OSPAR 2008). Furthermore, oxygen depletion caused by eutrophication continues to threaten this community.

Phosphorescent sea pen (*Pennatula phosphorea*), Kattegat, Denmark. © OCEANA

Slender sea pen (*Virgularia mirabilis*), Kattegat, Sweden. © OCEANA/ Carlos Minguell

From a Baltic perspective, the biotope is rare and is considered by HELCOM (1998) to be “potentially endangered”. OSPAR has listed this community as threatened and/or declining in Kattegat (OSPAR 2003).

4.5.9 MAERL BEDS | Maerl beds are benthic habitats consisting of unattached particles of calcified red algae from the genera *Lithothamnion* and *Phymatolithon* in gravel and sand in full marine conditions. In favorable conditions, these species can form extensive beds, typically covering 30% or more of the sea floor, mostly in coarse clean sediments of gravels, sands, or muddy/mixed sediments, which occur either along the open coast or in tide-swept channels of marine inlets. Maerl beds grow as unattached nodules or ‘rhodoliths,’ and have been recorded at a variety of depths, ranging from the lower shore to 30 m deep even though maerl requires light to photosynthesize. (HELCOM 1998, OSPAR 2008). Animals associated with maerl beds include many rare crustaceans, such as *Corystes cassivelaunus* and *Thia scutellata*, and echinoderms, such as *Ophiothrix fragilis* and *Ophiocomina nigra*.

In the Baltic Sea, the known areas of maerl beds are on the offshore banks of Kattegat and the Baltic Proper (e.g. Nodra Midsjöbank, Naturvårdsverket 2006). The presence of dead maerl on some offshore banks indicates that the habitat must have been more widespread in the past. Extraction, offshore wind-farms, destructive fishing methods and eutrophication are the main threats to this community. HELCOM considers maerl beds as "potentially endangered" (HELCOM 1998).

Suberites virgultosus aggregation on soft sediment bottom and northern krill (*Meganyctiphanes norvegica*) in Kattegat, Denmark. © OCEANA

Suberites virgultosus in Kattegat, Denmark. © OCEANA

4.6 SPONGE COMMUNITIES | Deep sea sponge aggregations are acknowledged as important habitat by OSPAR among others, because they increase both the physical heterogeneity of a habitat, and the number of available microhabitats, thereby creating additional space for fish and invertebrates in their different life stages. Sponge communities are principally composed of two classes: Hexactinellida and Demospongia. These sponges are found between depths of 250-1,300 m, where the temperature ranges between 4-10°C and the water current velocity is moderate (OSPAR 2008). Deep-sea sponge aggregations may be found on both soft and hard substrata.

The Baltic Sea has no deep sea sponge aggregations as described above, but Oceana proposes extending the definition of this habitat type to include sponge aggregations in shallower waters. We came across a considerable sponge aggregation (Demospongia *Suberites virgultosus*) in Kattegat trench (see section 5.1.1) at depths of 110-135 meters. This aggregation is best comparable to the sponge aggregations in the Bay of Biscay, which are often also excluded from the definition of this type of habitat (Oceana 2010). Deep sea sponge fields are known to support ophiuroids, which use the sponges as elevated perches (OSPAR 2008). In the area where we recorded this community, ophiuroids, like *Acrocnida brachiate*, *Ophiura albida* and *Ophiura ophiura* as well as polychaetes and crustaceans were found.

As this community is not recognised in the Baltic Sea, its extent is not known either.

King crab (*Lithodes maja*) on *Suberites virgultosus*, Kattegat, Denmark. © OCEANA

4.7 CORAL GARDENS | Coral gardens can occur on a wide range of soft and hard seabed substrata. The main characteristic of a coral garden is a relatively dense aggregation of colonies or individuals of one or more coral species (OSPAR 2008). Non-reef-forming cold-water corals occur in most regions of the North Atlantic, most commonly in water with temperatures between 3 and 8°C. The habitat is also found in the Baltic Sea in Kattegat, the Belt Sea and the Sound. Their bathymetric distribution can vary from 17 m depth (in Kattegat and the Sound, for instance) down to several thousand meters on open ocean seamounts.

The biological diversity of coral garden communities is typically high. In the Baltic Sea coral gardens mostly contain of coral belonging to leather corals (*Alcyonacea*) and/or sea pens (*Pennatulacea*). Also, reef-forming hard corals (*Lophelia pertusa*) can be present, but 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 brittle stars, crinoids, molluscs, crustaceans and fish (OSPAR 2008).

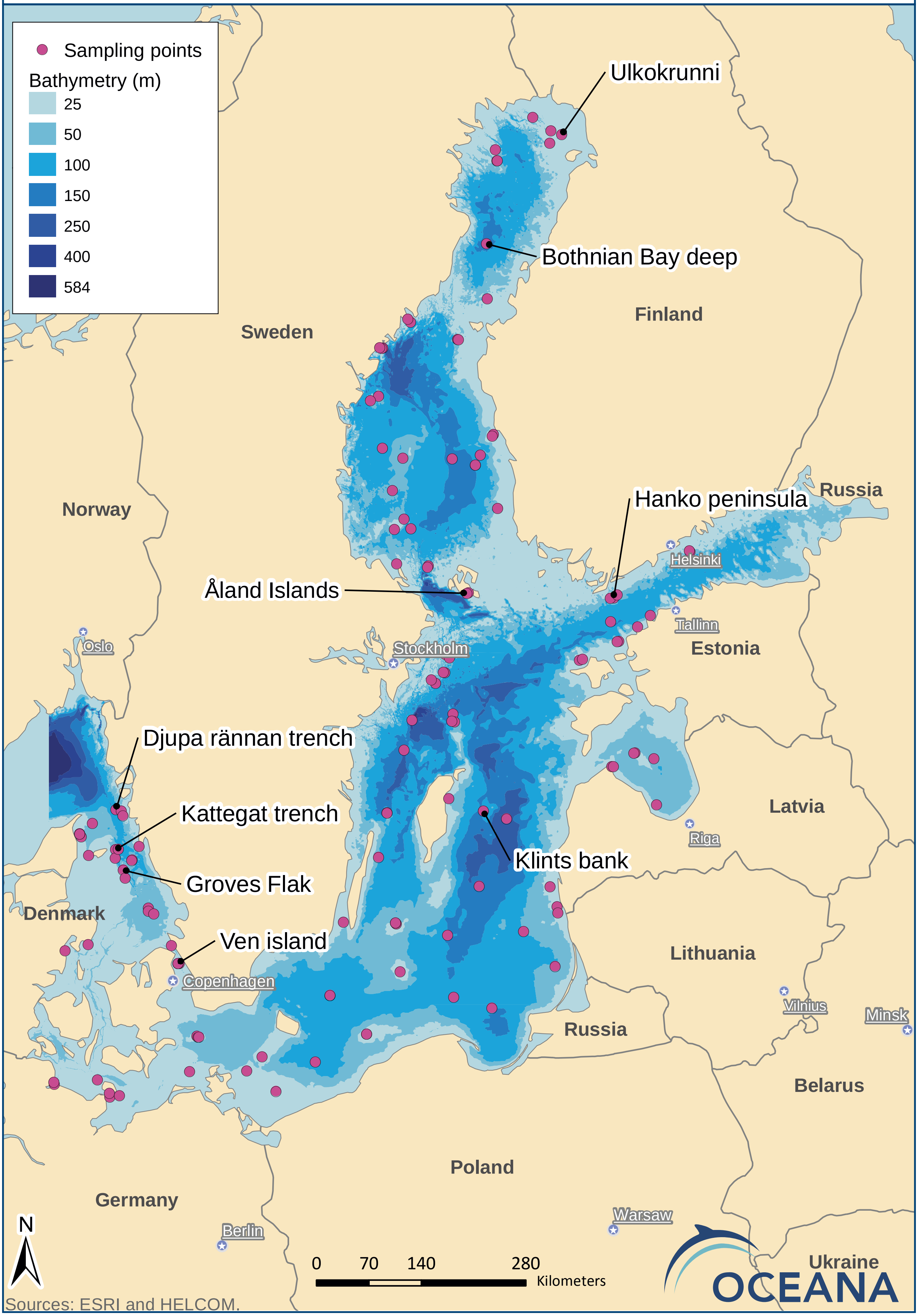
Coral gardens are listed as threatened and/or declining everywhere they occur (OSPAR 2003). However it should be noted that the OSPAR definition for coral gardens does not encompass shelf and coastal water habitats with seapen and octocoral communities (for example *Alcyonium* spp.) that were recorded in the course of the Oceana expedition. Oceana proposes, though, to broaden the description of the coral gardens to include also this specific type of this habitat thriving in the Baltic Sea.

Coral gardens dominated by octocoral *Alcyonium digitatum*, Kattegat, Denmark. © OCEANA

5. Results

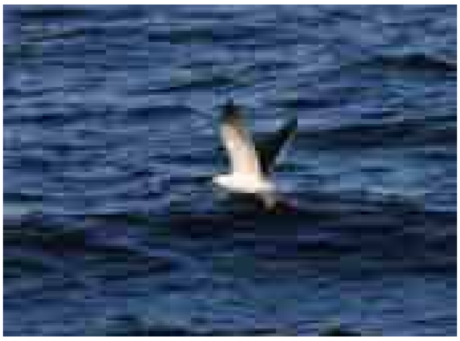

Flounder (*Platichthys flesus*), Northern Baltic Proper, Sweden. © OCEANA/ Carlos Minguell

Figure 3



Sampling points
Bathymetry (m)
25
50
100
150
250
400
584
Ulkokrunni
Bothnian Bay deep
Finland
Sweden
Norway
Hanko peninsula
Russia
Helsinki
Åland Islands
Tallinn
Oslo
Stockholm
Estonia
Djupa rännan trench
Kattegat trench
Latvia
Riga
Klints bank
Groves Flak
Denmark
Ven island
Lithuania
Copenhagen
Vilnius
Minsk
Russia
Belarus
Poland
Germany
Warsaw
Berlin
N
0
70
140
280
Kilometers
Ukraine
OCEANA
Sources: ESRI and HELCOM.

This section introduces the nine places we consider to be the most critical to protect. These areas represent habitats, communities and species that are currently underrepresented in the current MPA network. Additionally, they are located in geographic regions that lack protected sites (Figure 3). Annex III includes a full list of species observed during Oceana's expedition, but site specific lists are included under each of the following sections.



Seagull, Kattegat, Denmark.
© OCEANA/ Carlos Minguell

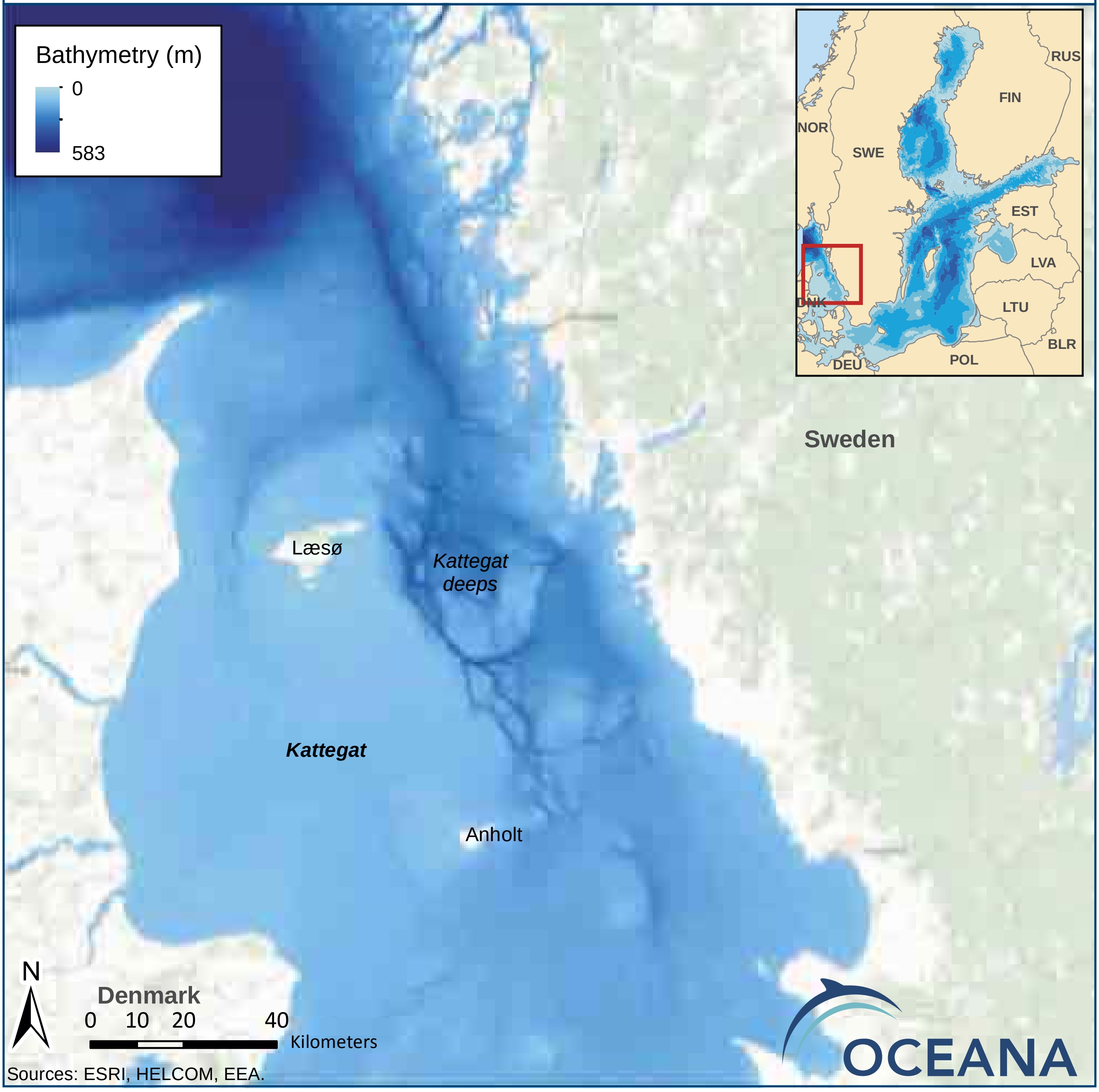
5.1. KATTEGAT | Kattegat is the transition zone between the North Sea and the Baltic Sea, and is home to a number of true marine species that are absent in other areas of the Baltic. Most of Kattegat is located in the Danish EEZ. It is relatively shallow and has an average depth of 23 m (Matthews *et al.* 1999). However, in the northern part of Kattegat, between Denmark and Sweden, a series of marine depressions remain from the last glaciation period. This formation on the seafloor resembles a former riverbed, and begins northeast of Læsø and continues for approximately 45 km to the southeast (Figure 4). The four deepest spots in the area vary in depth, from between 130 and over 150 meters, and are named after German research vessels: Poseidon, Alkor, Sagitta and Littorina. Salty water from the Skagerrak inflows towards the Baltic via these deep furrows.

Polychaeta *Polydora ciliata*, Kattegat, Denmark.
© OCEANA/ Carlos Minguell

In Kattegat, Oceana did 14 ROV recordings, took three dredge samples and completed six scuba dives both inside and outside of marine protected areas during April and May 2011. As the focus of this report is on proposing new protected areas, seven of these surveyed places comprising three different proposed protected areas will be discussed in detail. All of our proposed MPAs are situated in the area of the deep, high salinity canyons. This area is known to host a large number of species and having a great importance for the Northern krill (*Meganyctiphanes norvegica*) (Sørensen 2005). There is also a high complexity among the bottom features with massive reef formations rising nearly 40 meters up from a soft seabed including bolder reefs, bubbling reefs, large flint stones etc. (Krog 1999).

Shorthorn sculpin (*Myoxocephalus scorpius*) on bolder reef, Kattegat, Denmark.
© OCEANA/ Carlos Minguell

Figure 4



The deepest spots in Kattegat were discovered by marine zoological expeditions in 1982 and subsequently described by Ulrich (1983). The topography of this area has not been put into charts but is described in Ulrich (1983) and Ulrich & Eisele (1993). To large extent the benthic communities of this area have not been studied in great detail either (Nordberg *et al.* 1999, Sørensen 2005, Michael Olesen pers. comm.). However, it is widely accepted that the deep areas of Kattegat contain a unique set of species and habitats for the Baltic Sea. Unfortunately, it is a place that remains totally unprotected.

5.1.1. KATTEGAT TRENCH | The first area of interest lies in the central part of Kattegat in waters shared by Denmark and Sweden. Oceana surveyed three areas around the Sagitta deep (Figure 5) and to the south of it with an ROV in depths varying from 85 to 138 meters. We recorded 59 distinctive species (Table 2) and came across several community assemblages (Table 3), some of which are considered to be threatened and/or declining by HELCOM and OSPAR. In general, the area was considerably rich both in number of species and number of individuals.

Figure 5

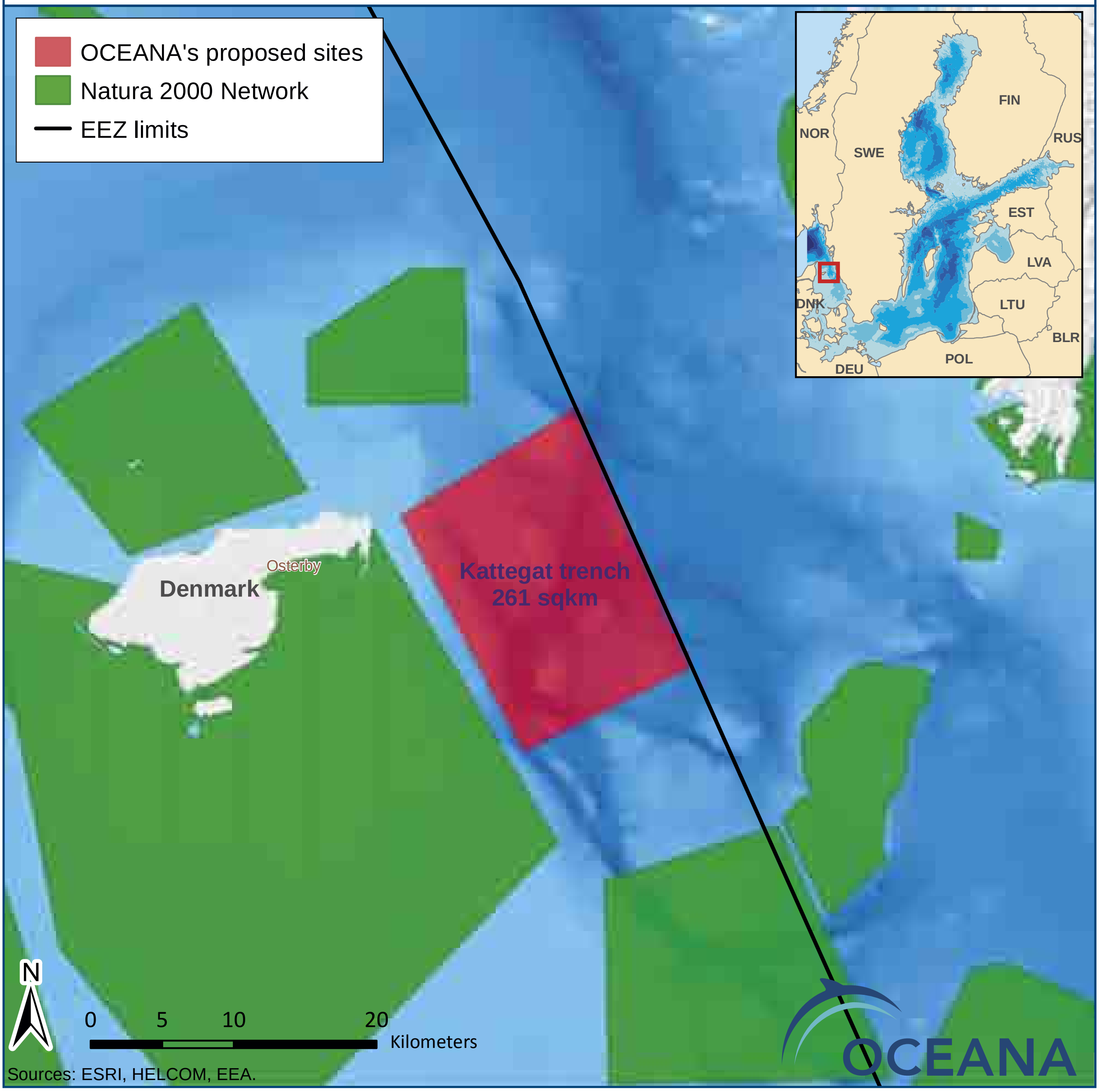


Table 2. List of species recorded from Kattegat trench. Possible threat category indicated in brackets.

PORIFERA	
Demospongiae	*Lophonopsis nigricans*
Haliclona urceolus	*Suberites virgultosus*
HYDROZOA	
Halecium halecinum	*Sertularella* sp.
Nemertesia ramosa	*Sertularia cupressina*
Rhizocaulus verticillatus	
ANTHOZOA	
Alcyonium digitatum	*Pennatula phosphorea*
Pachycerianthus multiplicatus	*Urticina felina*
SCYPHOZOA	
Cyanea lamarckii	
CTENOPHORA	
Beroe cucumis	*Pleurobrachia pileus*
ANNELIDA	
Arenicola marina	*Sabella penicillus*
Filograna implexa	
MOLLUSCA	
Buccinum undatum	*Nucula* sp.
Modiolus modiolus	*Parvicardium exiguum*
Neptunea antiqua	
CRUSTACEA	
Cancer pagurus	*Meganyctiphanes norvegica*
Haploops sp.	*Munida rugosa*
Hyas araneus	*Pagurus bernhardus*
Lithodes maja	*Pandalus borealis*
BRYOZOA	
Crisia eburnea	*Reteporella beaniana*
BRACHIOPODA	
Neocrania anomala	
ECHINODERMATA	
Acrocnida brachiata	*Ophiopholis aculeata*
Amphiura cf. *chiajei*	*Ophiura albida*
Brissopsis lyrifera	*Ophiura ophiura*
Echinus esculentus (NT, IUCN)	*Spatangus purpureus*
TUNICATA	
Ascidiacea	
FISH	
Enchelyopus (*Rhinonemus*) *cimbrius*	*Microstomus kitt* (probably declining, HELCOM)
Gadus morhua (threatened and declining, HELCOM, OSPAR)	*Merlangius merlangus* (probably declining, HELCOM)
Hippoglossoides platessoides (probably declining, HELCOM)	*Molva molva* (HELCOM: vulnerable)
Limanda limanda (probably declining, HELCOM)	*Myxine glutinosa*
Lumpenus lampretaeformis (CR, but not in KA, HELCOM)	*Pleuronectes platessa* (probably declining, HELCOM)
Lycodes vahli	*Reinhardtius hippoglossoides*
Micromesistius poutassou (probably declining, HELCOM)	*Solea solea* (probably declining, HELCOM)
ALGAE	
Laminaria saccharina	

Bryozoa *Crisia eburnea*, Kattegat trench. © OCEANA

Sponge *Suberites virgultosus* covered with sediments, Kattegat trench. © OCEANA

Cod (*Gadus morhua*) on bolder reef, Kattegat trench.© OCEANA

Table 3. List of habitats and communities recorded in Kattegat trench and their threat category.

Habitat/community	Red list category
Amphiura	
Coral garden	Threatened and/or declining (OSPAR)
Echinoderm	
Haploops	No official assessment but HELCOM proposed EN
Modiolus bed	Threatened and/or declining (OSPAR)
Tube worm	
Sea pens with burrowing megafauna	Threatened and/or declining (OSPAR and HELCOM)
Baltic sponge aggregation	Deep sea sponge aggregations are listed as threatened and/or declining by OSPAR
Pelagic, offshore (deep) waters	Listed as threatened by HELCOM

Kattegat trench is characterized with soft-bottom communities and species (see section 4.5), which thrive in substrate that consists of mud or mixed sand-mud with rocks. We recorded particularly high numbers of Northern krill in the water column. Krills are an important part of the food chain because they graze on phytoplankton, and are fed upon by larger animals, including fish and mammals. Different crustaceans, like *Lithodes maja*, *Pagurus bernhardus*, *Pandalus borealis*, *Hyas araneus* and *Munida rugosa* were also observed in high numbers. The prevailing benthic communities included *Modiolus* beds, tube worms, sea pens with burrowing megafauna, burrowing brittle stars, like *Amphiura* sp. and *Acrocnida brachiate*, and other echinoderms, like sea urchins. Rosenberg *et al*. (2000) recorded high abundances of tube-building polychates (*Maldane sarsi*), heart sea urchins (*Brissopsis lyrifera*) and brittle stars (*Ophiura affinis*, *Amphiura chiajei*, *A. filiformis*) nearby during their study of the area. They concluded that the faunal composition and the community structure were related to the depth of the area.

Modiolus beds are known to have declined severely during the past few decades in the Baltic Sea, particularly in Kattegat. This is assumed to be due to several factors, including the destruction caused by bottom trawling (Göransson & Bertilsson 2010). Burrowing megafauna communities are also known to support fauna of smaller and bigger animals, forming an important reservoir of biodiversity (Hughes 1998). The megafauna community is also classified as threatened and/or declining in Kattegat region.

Echinoderm community dominated by heart urchins (*Brissopsis lyrifera*), Kattegat trench. © OCEANA

King crab (*Lithodes maja*), Kattegat trench. © OCEANA

American plaice (*Hippoglossoides platessoides*), Kattegat trench. © OCEANA

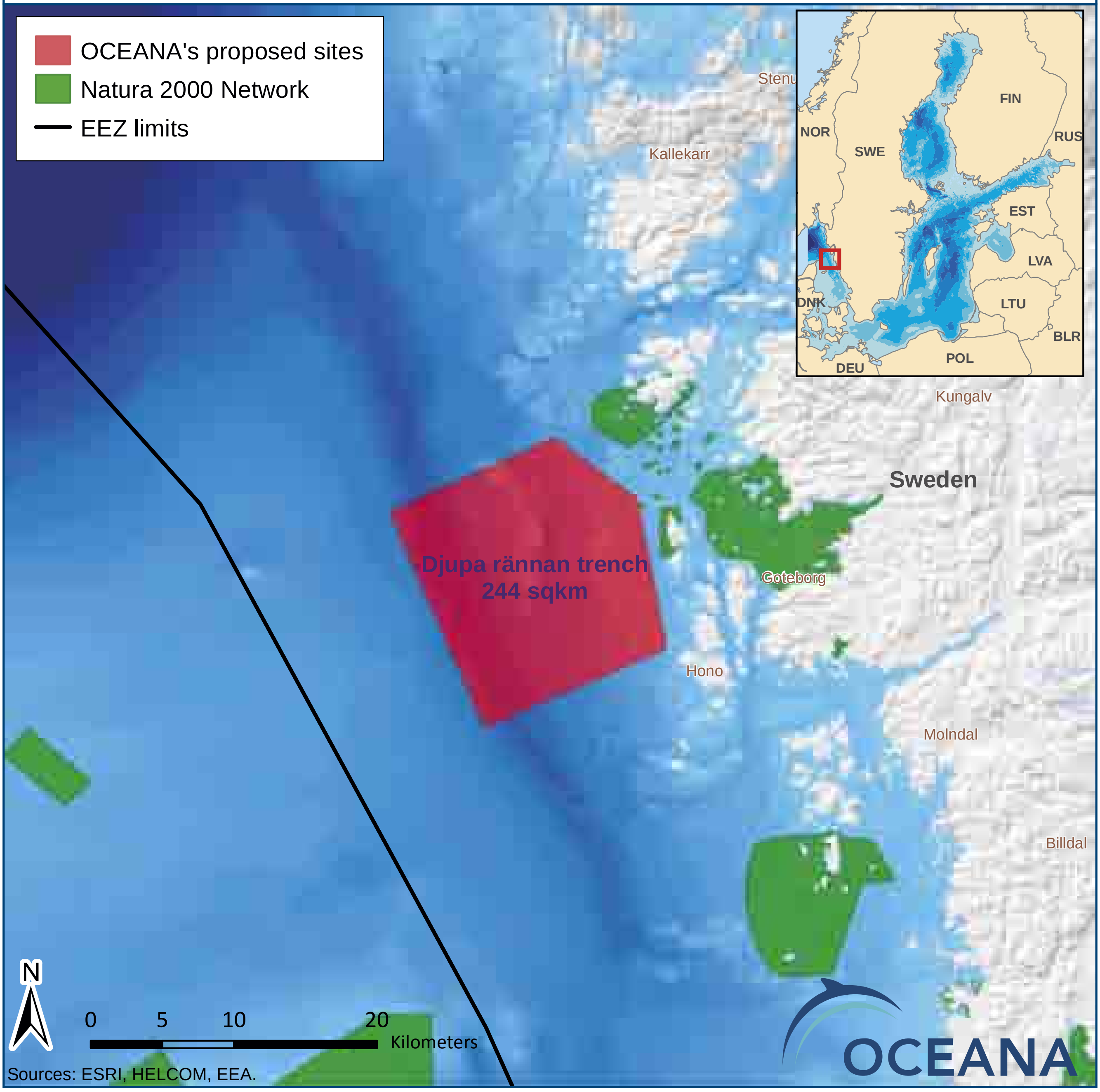
Another distinctive community recorded in depths of Kattegat, from 110 to 135 meters, was a dense aggregation of sponges called *Suberites virgultosus* (see section 4.6). These sponges were the dominating species in parts of the area, and sometimes they were mixed with other types of sponges. Sponge communities in the Baltic have not been described before, so the community is not well-studied and its status is not known either. We propose to include this community in the list of Baltic Sea habitats. Similarly the definition of coral gardens should be broadened to include the *Alcyonium digitatum* dominated coral garden type recorded from this place (see also section 4.7)

Most notably, besides the unique and rich biodiversity we observed in Kattegat, we also recorded trawling marks and badly disturbed seabeds. Because of the sensitive nature of the soft bottom communities, no trawling should be allowed in this area. Oceana strongly recommends the protection of this area because of the types of communities described and due to under representation of the protection of these deep water communities, which are crucial to the functioning of the entire ecosystem by providing food and shelter for many other species, including commercially important fish.

Seabed disturbed by bottom trawling, Kattegat trench. © OCEANA

5.1.2. DJUPA RÄNNAN TRENCH | The Djupa rännan trench runs along the west coast of Sweden, and is part of the same formation as the Kattegat trench. The depth of the water in the Djupa rännan ranges between 70 and 95 m (Nordberg *et al.* 1999). Oceana surveyed this area in three different places with two ROVs and one scuba dive (Figure 6) at depths reaching about 61 meters.

Figure 6



Altogether, 61 different species were recorded by our scientists, including many species of fish (Table 4). The shallower areas of the trench are mainly composed of dense macrophyte meadows, while soft bottom communities dominate the deeper parts (Table 5). The sides of the Djupa rännan drop steeply for 20 meters, but then level out as you move deeper. At 20 meters deep, the substrate consists mainly of stones and loose rock. Macrophyte meadows, abundant with epifauna, dominate up to 14 meters deep (see section 4.4), after which anemones, crabs, etc. become more common.

Table 4. List of species recorded from the Djupa rännan trench. Possible threat category indicated in brackets.

PORIFERA	
Halichondria panicea	*Haliclona urceolus*
HYDROZOA	
Bougainvillia ramosa	*Halecium halecinum*
Eudendrium rameum	*Tubularia* sp.
ANTHOZOA	
Alcyonium digitatum	*Sagartia troglodytes*
Metridium senile	*Stomphia coccinea*
Pennatula phosphorea	*Urticina felina*
Sagartiogeton laceratus	*Virgularia mirabilis*
SCYPHOZOA	
Cyanea lamarckii	
CTENOPHORA	
Beroe cucumis	
ANNELIDA	
Anobothrus sp.	*Sipunculus* sp.
Polyphysia crassa	
MOLLUSCA	
Coryphella verrucosa	*Pecten maximus*
CRUSTACEA	
Balanus crenatus	*Liocarcinus depurator*
Balanus improvisus	*Munida rugosa*
Cancer pagurus	*Pagurus bernhardus*
Caprella linearis	
BRYOZOA	
Crisia eburnea	*Electra pilosa*
ECHINODERMATA	
Amphiura chiajei	*Ophiocomina nigra*
Asterias rubens	*Spatangus purpureus*
Brissopsis lyrifera	*Thyone fusus*
TUNICATA	
Ascidiella scabra	*Dendrodoa grossularia*
Corella parallelogramma	
FISH	
Callionymus lyra	*Microstomus kitt* (probably declining, HELCOM)
Hippoglossoides platessoides (probably declining, HELCOM)	*Platichthys flesus*
Lesuerigobius friesi	*Pleuronectes platessa* (probably declining, HELCOM)
Lumpenus lampretaeformis (CR, but not in KA, HELCOM)	*Pomatoschistus microps*
Micromesistius poutassou (probably declining, HELCOM)	*Reinhardtius hippoglossoides*
Myxine glutinosa	*Trisopterus esmarkii*
ALGAE	
Corallina officinalis	*Laminaria digitata*
Delesseria sanguinea	*Laminaria saccharina*
Dilsea carnosa	*Lithothamnion glaciale*
Fucus vesiculosus	*Pelvetia canaliculata*
Halidrys siliquosa	
MAMMALIA	
Phoca vitulina	

Table 5. List of habitats and communities in the Djupa rännan trench and their threat category.

Habitat/community	Red list category
Amphiura	
Coral garden	Threatened and/or declining (OSPAR)
Echinoderms	
Macrophyte meadow	Threatened and/or declining (HELCOM)
Sea pens with burrowing megafauna	Threatened and/or declining (OSPAR and HELCOM)
Tube worm	

The deeper areas of the Djupa rännan trench consist of soft sediments, mostly mud and mixed sand-mud, with *Amphiura*, echinoderms, sea pens and burrowing megafauna communities (see section 4.5) as well as *Alcyonium digitatum* dominated coral gardens (see section 4.7). Polychaeta holes and tubes are also observed, reflecting a healthy sea bottom with good oxygen conditions. In general, this area can be described as diverse in terms of number of species and number of individuals.

Hermit crab (*Pagurus bernhardus*) and heart urchin (*Brissopsis lyrifera*), Djupa rännan trench. © OCEANA

American plaice (*Hippoglossoides platessoides*), Djupa rännan trench. © OCEANA

Rich macrophyte meadow with kelps (*Laminaria saccharina*, *L. digitata*) and channelled wrack (*Pelvetia canaliculata*) in Djupa rännan trench. © OCEANA/ Carlos Minguell

Sea anemone *Urticina felina*, Djupa rännan trench. © OCEANA/ Carlos Minguell

Coral garden dominated by dead man's finger (*Alcyonium digitatum*), Djupa rännan trench. © OCEANA/ Carlos Minguell

Bryozoa *Crisia eburnea* covering a stone in Djupa rännan trench. © OCEANA/ Carlos Minguell

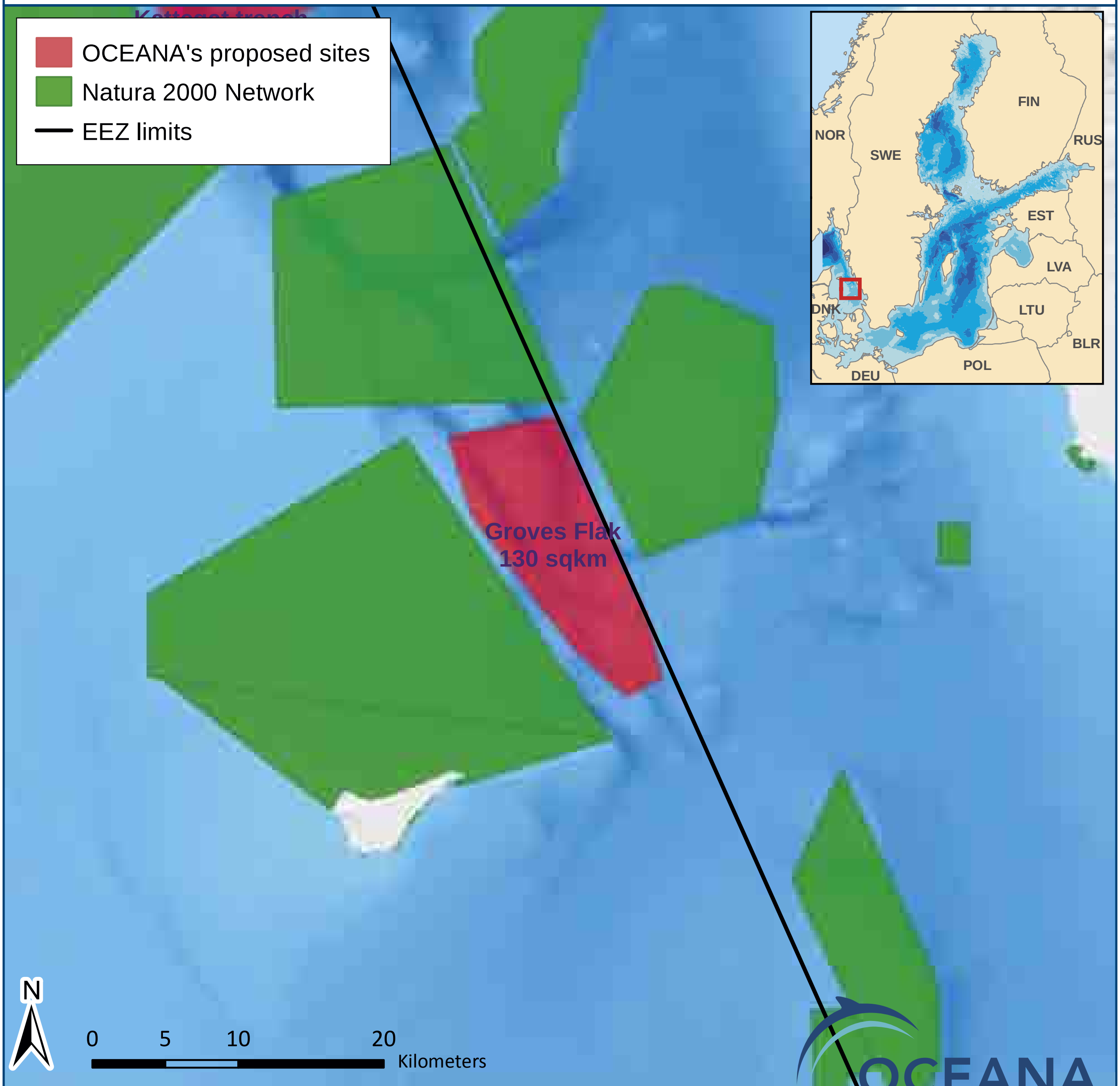
On the Swedish coast, near the Djupa rännan trench there are two marine protected areas (Figure 6): Sälöfjorden and Nordre älvs estuary. Both of these MPAs are included in the Natura 2000 network (SPA and SCI), and cover terrestrial and marine areas. However, neither of these sites is truly marine and they are located near coastal, shallow waters. The Natura 2000 standard data form lists 12 habitats from the Sälöfjorden (Annex I of the Habitats Directive). These habitats include reefs and sandbanks, but most are terrestrial. Of the mammals in the area, the data form mentions harbor seals (*Phoca vitulina*). According the standard data form for the Nordre älvs estuary, 16 habitats from the Annex I are listed. Ten of these habitats are completely terrestrial, and only two can be considered truly marine (sandbanks and reefs). Additionally, three Natura 2000 Annex II species are present in the area: harbor seals, asp (*Aspius aspius*) and salmon (*Salmo salar*). The data form also lists 20 other important species in the area, but only one is marine: the sea trout (*Salmo trutta*). Therefore, the protection of this area would contribute and enhance the conservation of the marine nature of this area considerably.

Again, it is important to mention that parts of the area Oceana studied were clearly disturbed by bottom trawling. Due to natural environments of this area, bottom trawling should be immediately prohibited and the trenches of Kattegat should be protected.

5.1.3. GROVES FLAK | Groves flak is a peak rising from the southern end of Kattegat deep, near the border of the Swedish EEZ and between the islands of Læsø and Anholt (Figure 7). The area consists of a mixed hard bottom with sand and a mixed soft bottom in deeper parts with mud, sand and gravel. Many fish, like sole (*Solea solea*), lumpfish (*Cyclopterus lumpus*), plaice (*Pleuronectes platessa*) and brill (*Scophthalmus rhombus*), as well as many crabs, have been recorded in the area (Krog 1999). On the Swedish side of Kattegat, near Groves Flak, there are two Natura 2000 sites: Fladen and Lille Middelgrund. Both are part of a chain of submerged banks and reefs that host a variety of macroalga communities with rare and sensitive species.

Unfortunately, the Natura 2000 standard data forms list very few features from these two areas, including reefs, sandbanks and bubbling reefs. This area is also known to be an important spawning and nursery ground for herring and also other fish species (Sørensen 2005).

Figure 7



Sources: ESRI, HELCOM, EEA.

Oceana surveyed Groves flak with an ROV at depths ranging from 30 to 84 meters and also took bottom sample with the grab. We recorded 46 (Table 6) species including several flatfish, starfish, and brittle stars like important habitat-builder *Amphiuras*. Other major communities observed were *Haploops* and tube-worm communities (at some places these communities were mixed together, see sections 4.5.4 and 4.5.5), as well as sea pens with burrowing megafauna communities (see section 4.5.8) and octocoral gardens (see section 4.7) (Table 7). Also, polychaeta *Harmothoe* sp. thrives in this area.

Table 6. List of species recorded from Groves flak. Possible threat category indicated in brackets.

PORIFERA	
Clathria sp.	
HYDROZOA	
Rhizocaulus verticillatus	
ANTHOZOA	
Alcyonium digitatum	*Urticina felina*
Pennatula phosphorea	*Virgularia mirabilis*
CTENOPHORA	
Beroe cucumis	
ANNELIDA	
Amphitrite cirrata	*Pomatoceros triqueter*
Arenicola marina	*Spirorbis* sp.
Harmothoe sp.	*Terebellides stroemii*
Myxicola infundibulum	
MOLLUSCA	
Astarte montagui	*Pecten maximus*
Buccinum undatum	*Polinices pallidus*
Modiolus modiolus	*Pseudamussium peslutrae*
Nuculana pernula	*Turritella communis*
CRUSTACEA	
Cancer pagurus	*Pagurus bernhardus*
Haploops tubicola	*Pandalus borealis*
Meganyctiphanes norvegica	
ECHINODERMATA	
Amphiura sp.	*Marthasterias glacialis*
Asterias rubens	*Ophiocomina nigra*
Astropecten irregularis	*Ophiopholis aculeata*
Brissopsis lyrifera	*Ophiothrix fragilis*
Henricia sanguinolenta	*Ophiura albida*
FISH	
Callionymus lyra	*Melanogrammus aeglefinus*
Hippoglossoides platessoides (probably declining, HELCOM)	*Solea solea* (probably declining, HELCOM)
Limanda limanda (probably declining, HELCOM)	*Trachinus draco*
Lumpenus lampretaeformis (CR, but not in KA, HELCOM)	
ALGAE	
Laminaria saccharina	*Phymatolithon lenormandii*

Table 7. List of habitats and communities in Groves flak and their threat category.

Habitat/community	Red list category
Amphiura	
Coral garden	Threatened and/or declining (OSPAR)
Haploops	No official assessment but HELCOM suggestion is Endangered
Modiolus bed	Threatened and/or declining (OSPAR)
Sea pens with burrowing megafauna	Threatened and/or declining (OSPAR and HELCOM)
Tube-worm	

Sea anemone *Urticina felina*, Groves flak. © OCEANA

Heart urchin (*Brissopsis lyrifera*) burrowed in the soft sediments and polychaeta tubes, Groves flak. © OCEANA

Brittle star *Ophiura albida* with polychaeta tubes, Groves flak. © OCEANA

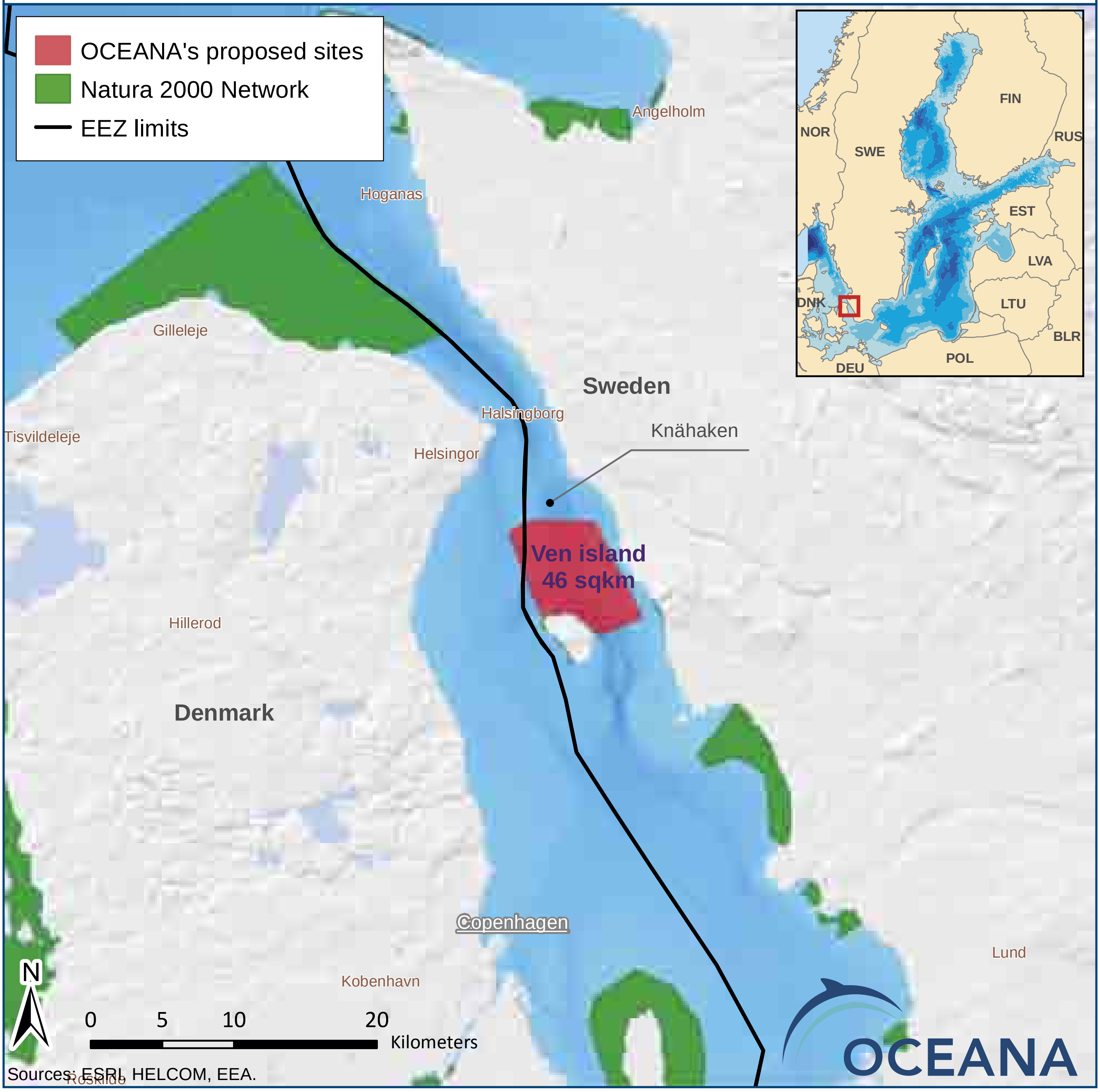
Phosphorescent sea pen (*Pennatula phosphorea*) and common sea star (*Asterias rubens*) on sand bottom, Groves flak. © OCEANA

Loose macrophyte at the bottom, Groves flak. © OCEANA

Groves flak deserves protection because of its special features and high diversity of important and habitat-building species. Protection of this area would also add deep water features from this distinctive area and would complement the existing coverage of marine protected areas. As Groves flak and the existing Natura 2000 sites are located so close to each other, it would be advisable to form a one large MPA over the central Kattegat - covering both deep water and shallow water reefs and banks. This would be done in coordination with the governance and management of the Danish and Swedish authorities.

5.2 VEN ISLAND | Ven island is in the northern part of the Sound, which is a shallow stretch of water between Sweden and Denmark that connects the Baltic Sea with Kattegat (Figure 8). The Sound is about 118 km long and between 4 and 28 km wide. The maximum depth in the Sound is about 50 m, found southeast of island Ven. Usually the depth varies between 20 and 50 meters deep. Between Copenhagen, Denmark and Malmö, Sweden, the Sound is only about 10 m deep and it is this sill that mostly prevents the high salinity water from the northern Sound to pass into the Baltic Sea.

Figure 8


OCEANA's proposed sites
Natura 2000 Network
EEZ limits
Angelholm
Hoganas
Gilleleje
Sweden
Halsingborg
Tisvildeleje
Helsingor
Knähaken
Ven island
46 sqkm
Hillerod
Denmark
Copenhagen
Lund
Kobenhavn
N
0 5 10 20
Kilometers
Sources: ESRI, HELCOM, EEA.
Roskilde
OCEANA
NOR
FIN
RUS
SWE
EST
LVA
DNK
LTU
BLR
POL
DEU

The bottom features of the Sound vary between the shallow coastal areas and those in the central parts of the Sound. Near the coast, shallow bays consist mostly of sand and the salinity of the bays tends to be low because of river run-off. The deep, central parts of the Sound are comprised of silt, clay and mud, and the salinity levels are high. To a minor extent, there are also reefs, mussel banks and exposed rock bottom areas.

There are eight Natura 2000 sites on both the Swedish and Danish sides of the Sound (Figure 8), mostly located in the southern part of the Sound. Since 1932, the Sound as a whole has been protected from trawling. The introduction of this protection has hugely favoured the bottom ecosystems of the Sound over time, especially when compared to regions like Kattegat where extensive trawling continues to occur.

The bottom fauna of the Sound is rich and because of the trawling ban also largely un-touched. Major bottom fauna communities in the Sound include the *Macoma* community, the *Abra* community, the *Amphiura* community, the *Haploops* community and the *Modiolus* community. Bottom fauna constitute a food base for many species of fish, and converts organic material produced in the surface water. For this reason the deep bottoms and the fauna living therein are also the end storages for hazardous substances (The Sound Water Cooperation).

We studied the area north of Ven island with underwater robot and scuba dive in three different places (Figure 8) in May. 76 species were recorded at different depths, up to 40 meters (Table 8). The substrate in the deepest parts is mostly mud with rocks dominated by *Modiolus* beds (see section 4.1.2) and *Haploops* communities (see section 4.5.4) (Table 9). The shallower area substrate consists of stones, boulders and scattered rocks on sand and mixed sand-mud. *Modiolus* beds are also common in shallower waters, and we also recorded dense macrophyte meadows with kelp.

Sea anemone (*Urticina felina*), Kattegat, Denmark. © OCEANA/ Carlos Minguell

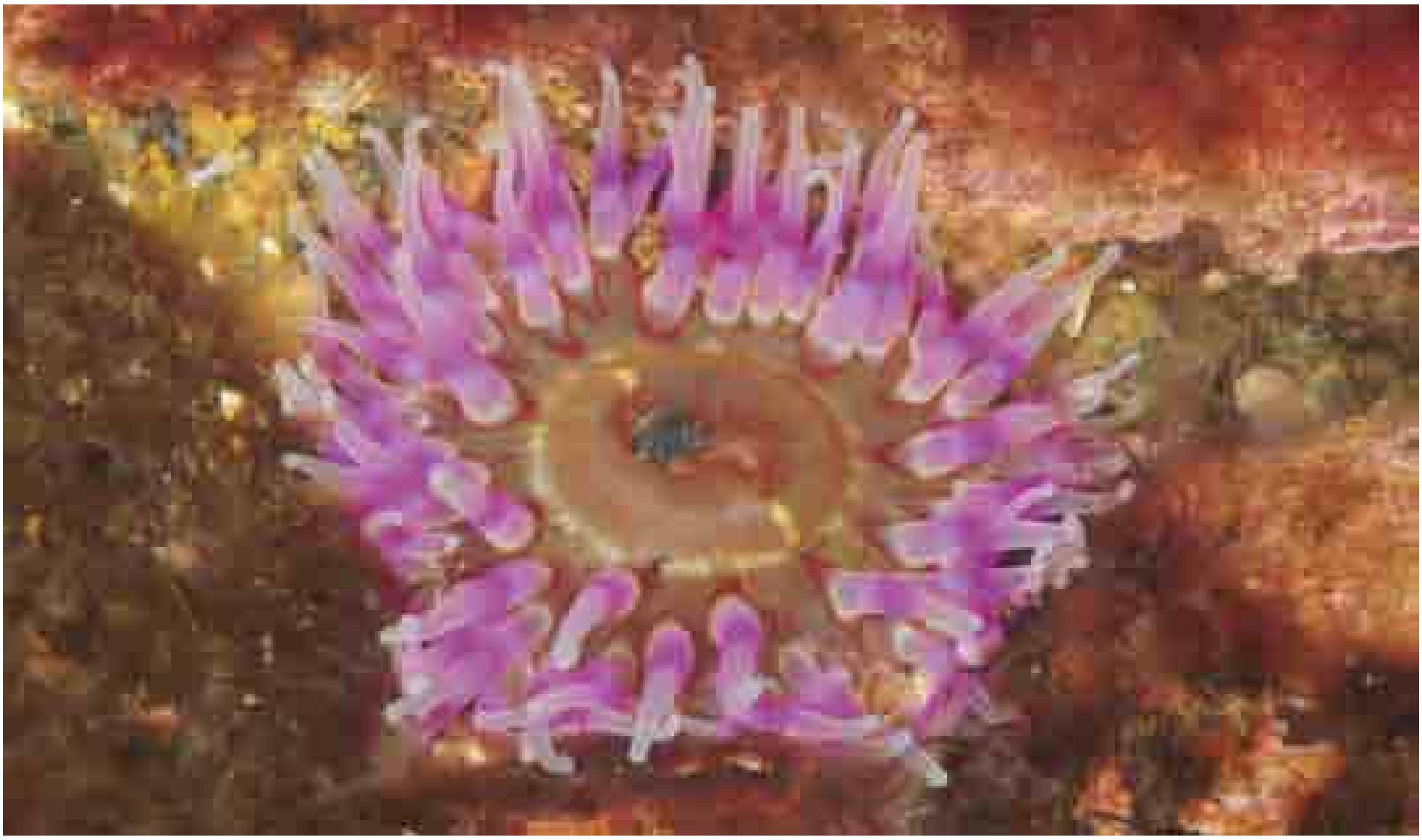


Table 8. List of species recorded from Ven island. Possible threat category indicated in brackets.

PORIFERA	
Halichondria panacea	*Haliclona limbata*
HYDROZOA	
Abietinaria abietina	*Kirchenpaueria pinnata*
Bougainvillia ramosa	*Laomedea flexuosa*
Clava multicornis	*Obelia geniculata*
Eudendrium rameum	*Tubularia indivisa*
Halecium halecinum	*Tubularia larynx*
ANTHOZOA	
Alcyonium digitatum	*Urticina felina*
Metridium senile	*Virgularia mirabilis*
ANNELIDA	
Neoamphitrite figulus	*Pygospio elegans*
Phascolion strombus	*Sabella penicillus*
Pomatoceros triqueter	*Spirorbis spirorbis*
MOLLUSCA	
Aequipecten opercularis	*Modiolus modiolus*
Aporrhais pespelecani	*Neptunea antiqua*
Bittium reticulatum	*Oenopota turricola*
Buccinum undatum	*Pecten maximus*
Cuthona nana	*Propebela* (*Oenopota*) (*Lora*) *turriculata*
Epitonium clathrus	*Tonicella rubra*
Hiatella arctica	*Tonicella marmorea*
Leptochiton sp.	
CRUSTACEA	
Balanus balanus	*Haploops tubicola*
Balanus improvisus	*Pagurus bernhardus*
Haploops tenuis	*Palaemonetes varians*
BRYOZOA	
Alcyonidioides mytili	*Membranipora membranacea*
Electra pilosa	
ECHINODERMATA	
Asterias rubens	*Ophiura albida*
Crossaster papposus	*Ophiura ophiura*
Henricia sanguinolenta	*Ophiura robusta*
Luidia sarsi	*Psammechinus miliaris*
Ophiocomina nigra	*Solaster endeca*
Ophiopholis aculeata	*Spatangus purpureus*
Ophiothrix fragilis	*Strongylocentrotus droebachiensis*
CHORDATA	
Dendrodoa grossularia	
FISH	
Amblyraja radiata (egg case) (threatened and declining, HELCOM)	*Pleuronectes platessa* (probably declining, HELCOM)
Gadus morhua (threatened and declining, HELCOM, OSPAR)	*Pomatoschistus minutus*
Gobiusculus flavescens	*Scophthalmus rhombus*
Limanda limanda (probably declining, HELCOM)	
ALGAE	
Delesseria sanguinea	*Palmaria palmata*
Halarachnion ligulatum	*Phymatolithon* sp.
Hildenbrandia rubra	*Phymatolithon lenormandii*
Laminaria saccharina	*Rhodophyllis divaricata*

Rocky bottom in the Ven island, Sweden, with red seaweeds, coralline red alga (*Phymatolithon* sp.), hydroid (*Clava multicornis*), chiton (*Tonicella* sp.). © OCEANA

Table 9. List of habitats and communities in Ven island and their threat category.

Habitat/community	Red list category
Coral garden	Threatened and/or declining (OSPAR)
Echinoderms	
Haploops	No official assessment but HELCOM suggestion is Endangered
Modiolus bed	Threatened and/or declining (OSPAR)
Macrophyte meadows including kelp	Threatened and/or declining (HELCOM)

Deeper water *Modiolus* bed, with different brittle stars, sea urchins and polychaeta, Ven island, Sweden. © OCEANA

Previous studies in the area have also recorded diverse communities and high species diversity (e.g. Göransson & Bertilsson 2010 and references therein). In addition, the area is known to be an important place for many commercial fish, like cod and flounder. Yet, there are no Natura 2000 sites in the northern part of the Sound. There is only a small municipal nature reserve along the Swedish coast called Knähaken, which is considerably rich in species diversity with 530 registered species from in an area of only 1.3 ha. The area also includes many important communities, like *Haploops*-, *Modiolus*-, *Abra*- and *Amphiura* communities. In 2003, the Environmental Committee in the City of Helsingborg proposed that all fishing in the area be forbidden but the proposal was not approved. Both commercial and leisure fishing continues to take place in the area (The Sound Water Cooperation).

Barnacle (*Balanus balanus*), Ven island, Sweden. © OCEANA/ Carlos Minguell

Baked bean ascidian (*Dendrodoa grossularia*) and polychaeta *Neoamphitrite figulus*, Ven island, Sweden. © OCEANA/ Carlos Minguell

Sugar kelp (*Laminaria saccharina*), Ven island, Sweden. © OCEANA/ Carlos Minguell

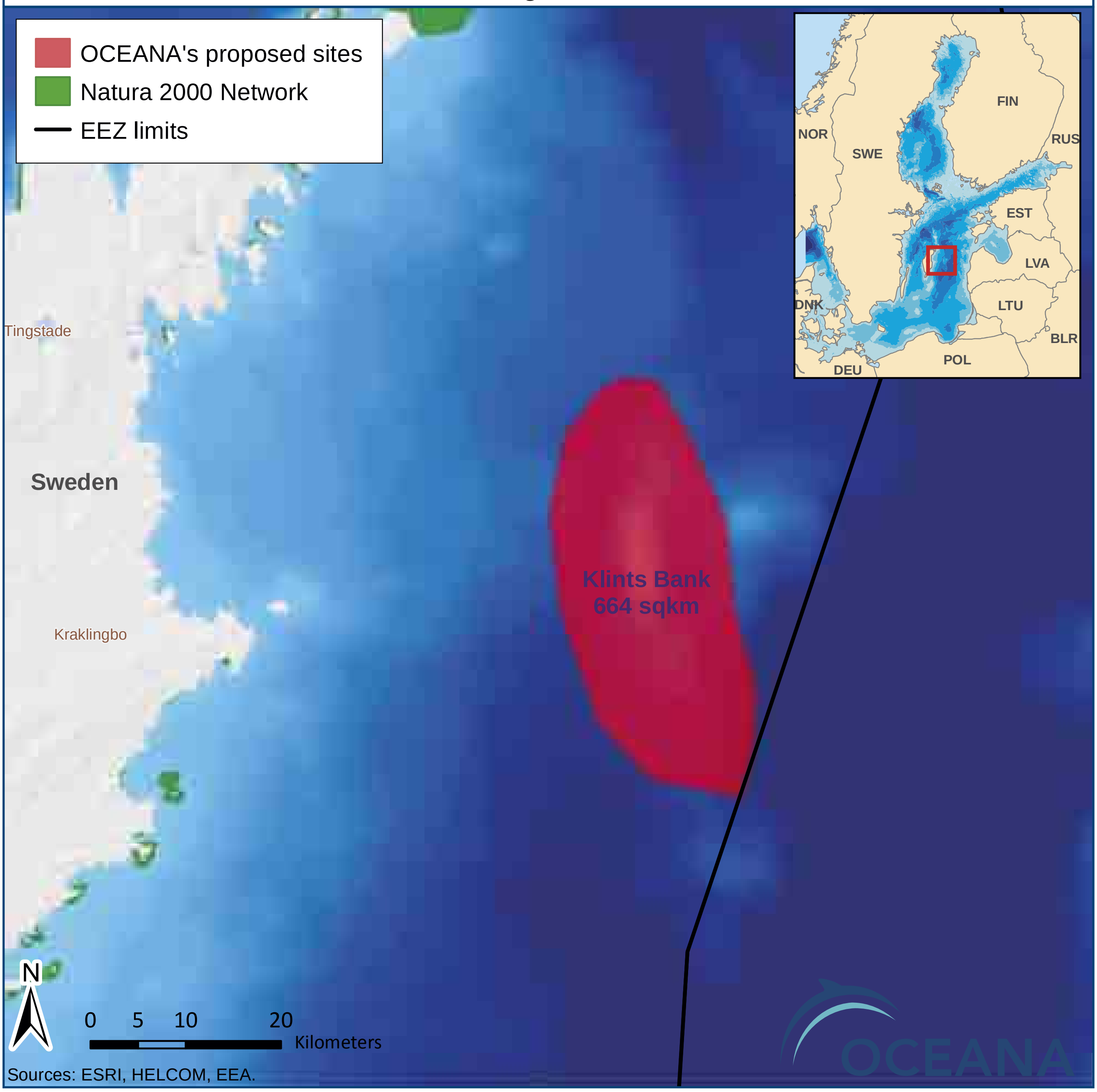
Modiolus bed with barnacles (*Balanus crenatus*), club hydroids (*Clava multicornis*), red seaweed (*Delesseria sanguinea*) and breadcrumb sponge (*Halichondria panicea*), Ven island, Sweden. © OCEANA/ Carlos Minguell

Besides the important *Haploops* and *Modiolus* communities, we also recorded abundant Echinoderm communities in the area as well as coral gardens dominated by octocoral *Alcyonium digitatum* (see section 4.7). The Ven island region also contains a number of threatened fish, including cod. Oceana also found a skate egg case (thorny skate, *Amblyraja radiata*) in this area.

Ven island and the whole of the Sound are clearly distinctive, and deserve to be better protected. Our findings support the view (Göransson & Bertilsson 2010, Michael Olesen, pers. comm.) that in order to save the last remnants of the *Haploops* and *Modiolus* communities, as well as other important communities and species present in the Sound, the area should be protected from all forms of impact to the seafloor. The waters of the Knähaken marine reserve should be expanded to include Ven island, and the area should be proposed to be included in Natura 2000 network.

5.3 KLINTS BANK | In the middle of the Baltic Sea, there is an offshore bank called Klints bank (Figure 9). It is a Swedish offshore bank and is placed about 50 km east of Gotland in the Eastern Gotland Basin. 20 km east of the bank is one of the Baltic Sea's deepest areas, the Gotland Deep, which has depths greater than 250 m. The water depth of Klints bank is approximately 28 meters deep, but it has a steep transition to the surrounding Gotland basin. The moraine-generated Klints bank is deeper than other offshore banks in the Baltic Sea, such as Norra Midsjöbanken and Södra Midsjöbanken (Virtasalo *et al.* 2011). Little is known about the ecology of Klints bank, but it is known to be an important area for waterfowl (Hjernquist GOF 2009).

Figure 9



Sources: ESRI, HELCOM, EEA.

Blue mussel (*Mytilus* sp.) on stone at Klints bank, Eastern Gotland Basin. © OCEANA

An ROV submersion was conducted by Oceana at Klints bank, 28 meters deep in April. A sand bottom with ripples marks, peppered with different sized stones, was documented. The visibility was good considering it is the Baltic Sea. Bigger stones were densely covered by blue mussels, a community that provides habitat for other attached animals, such as hydrozoans and bryozoans (see section 4.1.1) (Tables 10 and 11). Predatory fish recorded with the ROV included a couple of languid scorpion fish and a young cod, which is listed as threatened and/or declining by HELCOM (HELCOM 2007b)

Cod (*Gadus morhua*) at Klints Bank. © OCEANA

Even though the biodiversity from this transect was sparse, it stands in contrast to the benthic areas Oceana observed in the Gotland Deep. Oceana completed a couple of ROV dives at Gotland Deep; in the deepest part of Gotland Deep at 252 m, situated 35 km east of Klints bank, and in south-western part of Gotland Deep at 137 meters deep. Due to stratification (see section 2), the deeper parts of the Gotland Deep suffer from oxygen deficiency which hinders most multicellular organisms from living there. Occasionally, a phenomenon happens where major inflows of oxygen rich water from the North Sea reach the Gotland Deep via strong western winds. These inflows happen at irregular intervals, with up to 10 years in between. When these inflows happen, the bottom of Gotland Deep gets higher oxygen content, which enable species, such as *Monoporeia affinis* and *Bylgides sarsi*, from the surroundings to migrate and live there for few years (Virtasalo *et al.* 2011). Oceana's recordings of the seabed showed organic-rich mud, but no visible life. The Gotland Deep is currently in an anoxic condition, emphasized by the observed presence of dead medusa and white plastic bags at the seafloor.

No visible life at the Gotland deep, Sweden. © OCEANA

Since Klints bank is next to Gotland Deep with insufficient oxygen levels at the seabed, it possibly functions as a sanctuary for species escaping oxygen deficiency. Klints bank also influences the migration of species to the Gotland Deep during the times of inflow. Additionally, the bank is known to be an important area for cod spawning when salinity and oxygen levels are good. Klints bank should be protected because of its potential importance on its surroundings, and because the eastern Gotland Deep region is completely lacking marine protected areas. Currently, the central parts of the Baltic Proper are completely disconnected from the protected areas network. It is also a large, offshore sandbank and therefore as for all natural habitat types listed in the

Habitats Directive, an EU member state is obliged to take all appropriate steps to avoid further deterioration. This includes the obligation to protect all natural habitat types listed in the Habitats Directive within the Natura 2000 network and to designate as many SACs as necessary to guarantee the favorable conservation status.

Table 10: List of species recorded from Klints bank. Possible threat category indicated in brackets.

HYDROZOAN	
Laomedea fluxuosa	
BRYOZOANS	
Electra crustulenta	
MOLLUSCANS	
Mytilus sp.	
FISH	
Gadus morhua (threatened and declining, HELCOM)	*Myoxocephalus scorpius*

Table 11. List of habitats and communities in Klints bank and their threat category.

Habitat/community	Red list category
Mytilus bed	
Sandbanks	Endangered (HELCOM)

Eelpout (*Zoarces viviparus*) in Hanko peninsula, Finland. © OCEANA

Mytilus bed at Hanko peninsula, Finland. © OCEANA

Flounder (*Platichthys flesus*), Hanko peninsula, Finland. © OCEANA

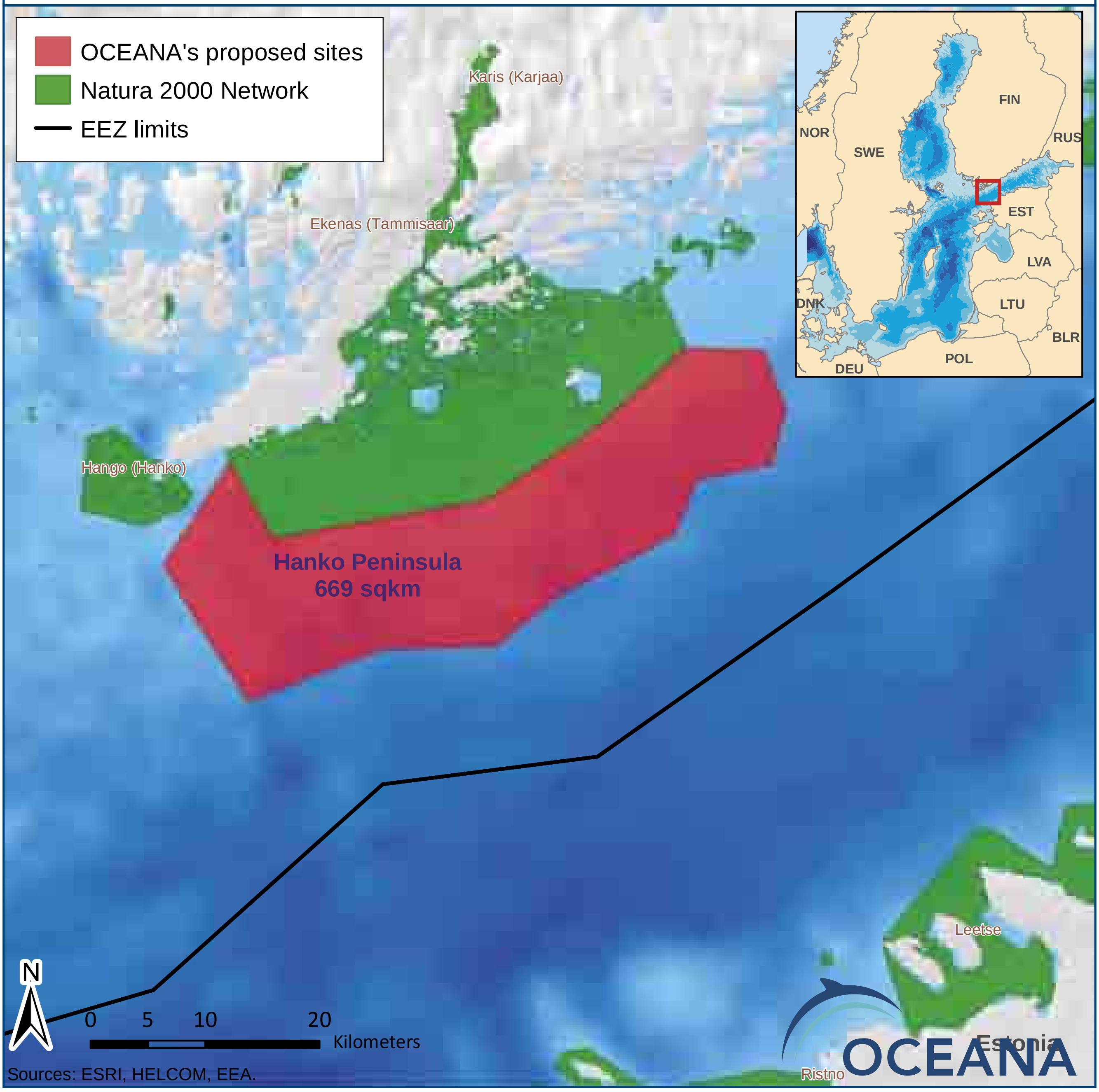
5.4 HANKO PENINSULA

The Hanko peninsula is situated at the entrance to the Gulf of Finland on the Finnish coast. Around the Hanko peninsula, the surface water has salinity around 5.5 to 7 psu. A thermocline develops in the spring, but the common upwellings in this area frequently mix the water column (Haapala 1994). Often, but not every year, the water in the Hanko peninsula freezes. But, the inshore parts of the archipelago freeze every year (Merkouriadi & Leppäranta 2010). Species in the area around the Hanko peninsula include true marine species, such as brown algae (*Fucus vesiculosus*) and cod (*Gadus morhua*), and true freshwater species such as pond weed (*Potamogeton perfoliatus*), pike (*Esox lucius*) and perch (*Perca fluviatilis*) (Tvärminne Zoological Station).

Male shorthorn sculpin (*Myoxocephalus scorpius*) protecting eggs, Gulf of Finland. © OCEANA/ Carlos Suarez

Oceana conducted three ROV submersions in an area southeast of Hanko peninsula in May, just south of a marine protected area (Figure 10). The dives were conducted in three places, in a line, with 4-6 km in between, at depths of at least 20 meters. In all three places, we documented boulders covered with blue mussel beds (Table 13). *Zoarces viviparus* was also present at all sites (Table 12). Other fish species observed were cod (*Gadus morhua*), flounder (*Platichthys flesus*), Gasterosteidae and two species of scorpion fish (*Taurulus bubalis* and *Myoxocephalus scorpius*). At the latter site, a male short-spined sea scorpion was observed while it protected the characteristic white eggs. Invertebrates such as bryozoan (*Electra crustulenta*), barnacle (*Balanus improvisus*), hydrozoan (*Laomedea* sp.) and isopod (*Saduria entomon*) were also documented.

Figure 10



Overall, the offshore area of Hanko peninsula has large *Mytilus*-beds. Oceana proposes the expansion of the already existing Natura 2000 site (Tammisaaren ja Hangon saariston ja Pohjanpitäjänlahden mertensuojelualue) to include these beds. Out of 29 Annex I habitats listed from the area in the standard data form, two are marine (sandbanks and reefs) and two are coastal (lagoons and large, shallow inlets and bays). Oceana's proposed expansion would guarantee better protection of the marine fauna in the area and would also enhance the representation of deeper water communities.

Table 12: List of species recorded from the Hanko peninsula. Possible threat category indicated in brackets.

CNIDARIANS HYDROZOANS	
Laomedea sp.	
CRUSTACEANS	
Balanus improvisus	*Balanus* sp.
Saduria entomon	
MOLLUSCANS	
Mytilus sp.	
BRYOZOANS	
Electra crustulenta	
FISH	
Gasterosteidae sp.	*Myoxocephalus scorpius*
Platichthys flesus	*Taurulus bubalis*
Zoarces viviparus	

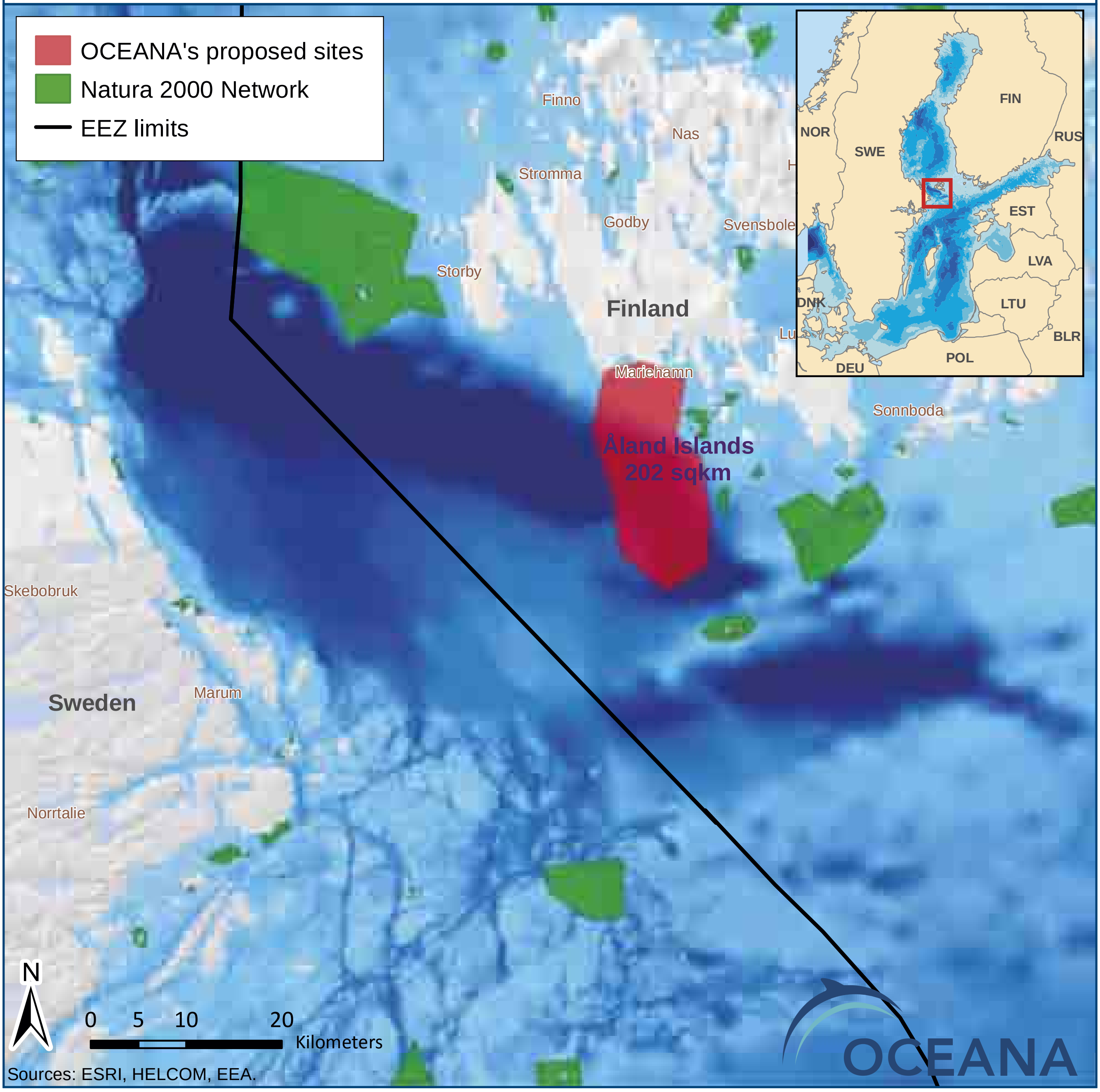
Table 13. List of habitats and communities in the Hanko peninsula and their threat category.

Habitat/community	Red list category
Mytilus beds	
Saduria community	*Saduria entomon* is listed as threatened and/or declining in the Southern Baltic Proper (HELCOM)
Sandbank	Endangered (HELCOM)
Reef	

Åland Islands archipelago, Finland.
© OCEANA/ Carlos Suarez

5.5 ÅLAND ISLANDS | The Åland Islands are situated between Finland and Sweden at the entrance to the Gulf of Bothnia (Figure 11). The archipelago consists of more than 6,500 islands. The Archipelago Sea, which includes also the Åland Islands, and the westernmost archipelago of SW Finland, includes 35,000 islands. The average water depth of the area is 23 m. During the winter, the sea is covered with ice for up to 3 months (Bonsdorff *et al.* 2003).

Figure 11



Sources: ESRI, HELCOM, EEA.

Physical factors, like the water temperature, dissolved oxygen saturation, and organic content of the sediment control the benthic groups in the archipelago regions. The *Monoporeia affinis* and *Macoma balthica* communities (see sections 4.5.7 and 4.5.1) are dominant in many places in the Archipelago Sea. High oxygen saturation and high organic content sediment (which is food for the infauna) benefit the *M. affinis* community. This community exists in depths greater than 20 m. The *M. balthica*-community prefers warmer water and shallower depths, around 20 meters, with high organic content sediment (Bonsdorff *et al*. 2003).

Since the 1960s, one of the major threats to the marine ecosystem of the coastal areas of Åland Islands has been eutrophication, caused by agriculture and rainbow trout (*Oncorhynchus mykiss*) farming (Bonsdorff *et al*. 1997). The fast-growing algal such as green algal *Cladophora* sp. and *Enteromorpha* sp. live in the shallow waters around the Åland Islands. These algae thrive in the nutrient rich water and results in suffocating the bladder wrack (see section 4.4.1) that lies beneath the surface and used to be more common here. This development is affecting the composition of communities and community structures. Some animals benefit from the growth of these algae and prefer to feed on those, including *Gammarus* spp., *Idotea balthica* and *Gastropoda* spp. But as the growth intensifies, they can't manage to keep the algae growth in balance leading for instance to the disappearance of bladder wrack (Goecker and Kåll 2003).

At the end of May 2011, Oceana did two scuba dives in the sheltered, shallow water inside the Åland archipelago; southeast of the island Granholm and southeast of the island Styrsö (Figure 11). Granholm is 2 km east of Styrsö, and is protected from the open sea by Styrsö. However, Styrsö does not face the open sea itself, as it is protected by more than a dozen smaller islands towards the southwest. The deepest area of the Åland Sea, 200 meters, is approximately 10 km southwest of the survey spots. Biodiversity is greater in the inshore sheltered areas, compared to the more exposed areas located near the open sea (Bonsdorff *et al*. 2003).

The dives revealed low visibility (approximately 3 meter) due to eutrophication. On one of the dives, silt was observed to be covering a large area of the bottom of the seafloor with methane discharge.

Åland Islands, Finland. © OCEANA/ Carlos Suarez

Twenty-two species were recorded at the Åland archipelago, including brackish water species (for instance the lagoon cockle *Cerastoderma lamarcki*), freshwater species (the pondweed *Potamogeton perfoliatus*) and marine species (such as *Mytilus* sp.) (Table 14). Several fish species were documented, such as the characteristic green, straight-nosed pipefish (*Nerophis ophidion*) with blue markings on the head. These waters are also known to be important spawning areas for many fish, like perch and herring (e.g. Parmanne 2001). The three-spined stickleback (*Gasterosteus aculeatus*), gobies (*Pomatoschistus minutes* and Gobiidae sp.), flatfish (*Pleuronectes platessa*) and widespread viviparous blenny (*Zoarces viviparus*) were observed. Not surprisingly, filming in the area's shallow water mostly showed footage of green algal, like sea lettuce, including *Enteromorpha prolifera* and *Monostroma grevillei*, and filamentous *Cladophora*. However, a noteworthy insect was documented in the water, a house building caddisfly (*Phryganea bipunctata*) which had dropped its house. Many places along the bottom were covered by a mix of microalgae, which probably included bacteria. The dominating communities include macrophyte meadows (see section 4.4) and water moss (see section 4.4.5) (Table 15).

Three-spined stickleback (*Gasterosteus aculeatus*), Åland Islands. © OCEANA/ Carlos Suarez

Lagoon cockle (*Cerastoderma lamarcki*), Åland Islands. © OCEANA/ Carlos Suarez

The house building caddisfly (*Phryganea bipunctata*), Åland Islands. © OCEANA/ Carlos Suarez

Straight-nosed pipefish (*Nerophis ophidion*), Åland Islands. © OCEANA/ Carlos Suarez

The pond snail *Radix peregra* on pondweed (*Potamogeton perfoliatus*), Åland Islands. © OCEANA/ Carlos Suarez

The Åland Islands are is lacking in marine protected areas, and therefore protection is urgently needed. The biodiversity of this studied inshore area is unique mix of marine and freshwater species and deserves to be better protected in order to safeguard the important feeding and spawning grounds of many fish and mammals. Also, in a place as badly eutrophied as this, it is even more important to set aside enough space to allow species and habitats to recover.

Table 14. List of species recorded in the Åland Islands. Possible threat category indicated in brackets.

CRUSTACEANS	
Balanus improvisus	*Saduria entomon*
MOLLUSCANS	
Cerastoderma lamarcki	*Mytilus* sp.
Radix peregra	
BRYOZOANS	
Electra crustulenta	
AMPHIPODA	
Amphipoda sp.	
FISH	
Gasterosteidae sp.	*Gasterosteus aculeatus*
Gobiidae sp.	*Nerophis ophidion*
Pleuronectes platessa (probably declining, HELCOM)	*Pomatoschistus minutus*
Zoarces viviparus	
ARTHROPODA, INSECTA	
Phryganea bipunctata	
MAGNOLIOPHYTA	
Ruppia sp.	
RHODOPHYTA	
Hildenbranchia rubra	
PHAEOPHYTA	
Halosiphon tomentosus	
CHLOROPHYTA	
Chaetomorpha sp.	*Enteromorpha prolifera*
Monostroma grevillei	
LILIOPSIDA	
Potamogeton perfoliatus	

Table 15. List of habitats and communities in the Åland Islands and their threat category.

Habitat/community	Red list category
Macrophyte meadow	Threatened and declining (HELCOM)
Water moss	

5.6 BOTHNIAN BAY | The most northern part of the Baltic Sea is the Bothnian Bay, north of the Quark. The average depth of the Bothnian Bay is 40 m, but some areas go down more than 100 meters (Bothnian Bay LIFE project). The bay has at least 120 ice days between January and April (Bergström & Bergström 1999). Generally, the whole Gulf of Bothnia, but particularly its northern part, is characterized as being less disturbed by nutrients compared to the rest of the Baltic Sea, due to less agriculture (HELCOM 2007b).

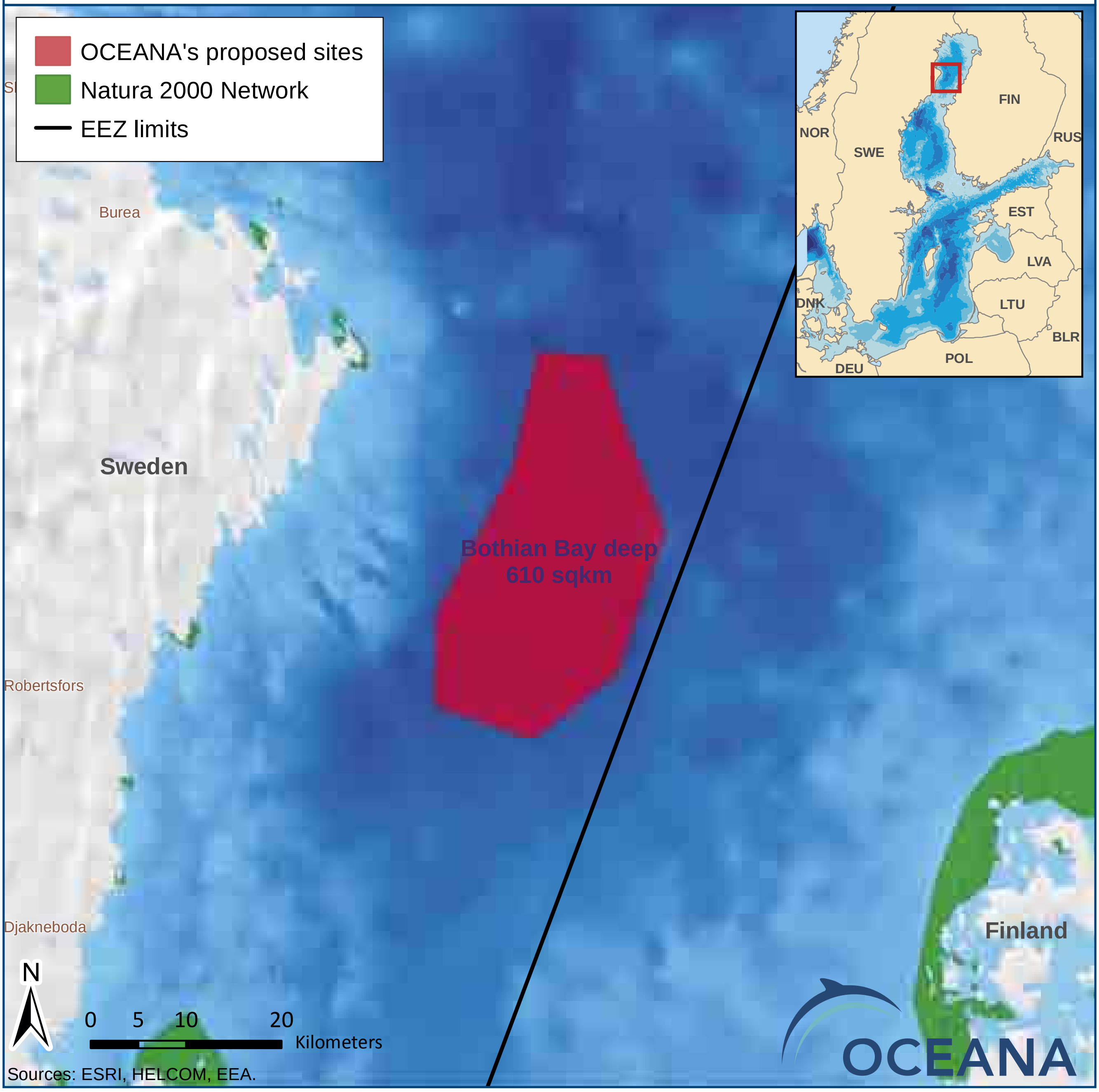
Bothnian Bay in late May.
© OCEANA/ Carlos Suarez

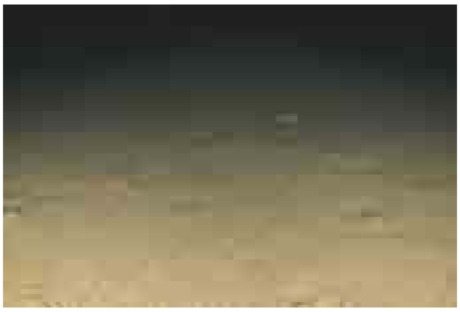
With a salinity of 3.5 psu in the Bothnian Bay, a limited number of marine species can live there (Bergström & Bergström 1999). Less than 10 marine fish species exist in the Bothnian Bay (Moen & Svensen 2008). Invertebrates living there include *Prostomatella obscura* (found at both shallow and deep water, i.e. 80 m depth), the bryozoan *Electra crustulenta*, the worm *Bylgides sarsi*, and the amphipod *Gammarus oceanicus* (Lassig 1965). Pondweed (*Potamogeton* sp.) and stoneworts (*Chara* sp.) also grow in the Bay's coastal waters; and, due to the low salinity, several freshwater species are present, including mosses (Bothnian Bay LIFE project).

5.6.1 BOTHNIAN BAY DEEP | The Bothnian Bay deep is an offshore area in the middle of the Bothnian Bay in the Swedish EEZ, with a depth of 147 meters. In the Bothnian Bay, the oxygen levels are very good, even in the deepest areas, and there has not been a significant change to these statistics since the 1970s as observed in other deep areas of the Baltic Sea (HELCOM 2007a).

Oceana conducted an ROV dive and a sediment sample of the seabed 114 meters deep, inside the Swedish EZZ in May (Figure 12). The ROV revealed good visibility along the bottom. In spite of this, only two species of crustaceans, *Saduria entomon* and *Neomysis integer*, were observed (Table 16). The sediment sample of the muddy seabed included one species of crustaceans, namely the *Monoporeia affinis* (see section 4.5.7) (Table 17).

Figure 12





Isopods (*Saduria entomon*) on 114 meters depth in the Bothnian Bay. © OCEANA

The central part of Bothnian Bay has no marine protected areas, and it is totally disconnected from the existing network of protected areas. The Bothnian Bay deep should especially be protected as it seems to have a healthy environment that does not suffer from eutrophication and oxygen depletion. It also includes pelagic offshore deep waters that are listed as threatened by HELCOM (HELCOM 2007) (see page 28). To enhance the connectivity of the existing network of protected areas, and to guarantee that this area stays in good condition, it should be designated as a marine protected area.

Table 16. List of species recorded in the Bothnian Bay deep. Possible threat category indicated in brackets.

CRUSTACEANS
Monoporeia affinis (Threatened and/or declining in the Gulfs of Finland and Riga, Northern and Southern Baltic Proper HELCOM 2007)
Neomysis integer
Saduria entomon

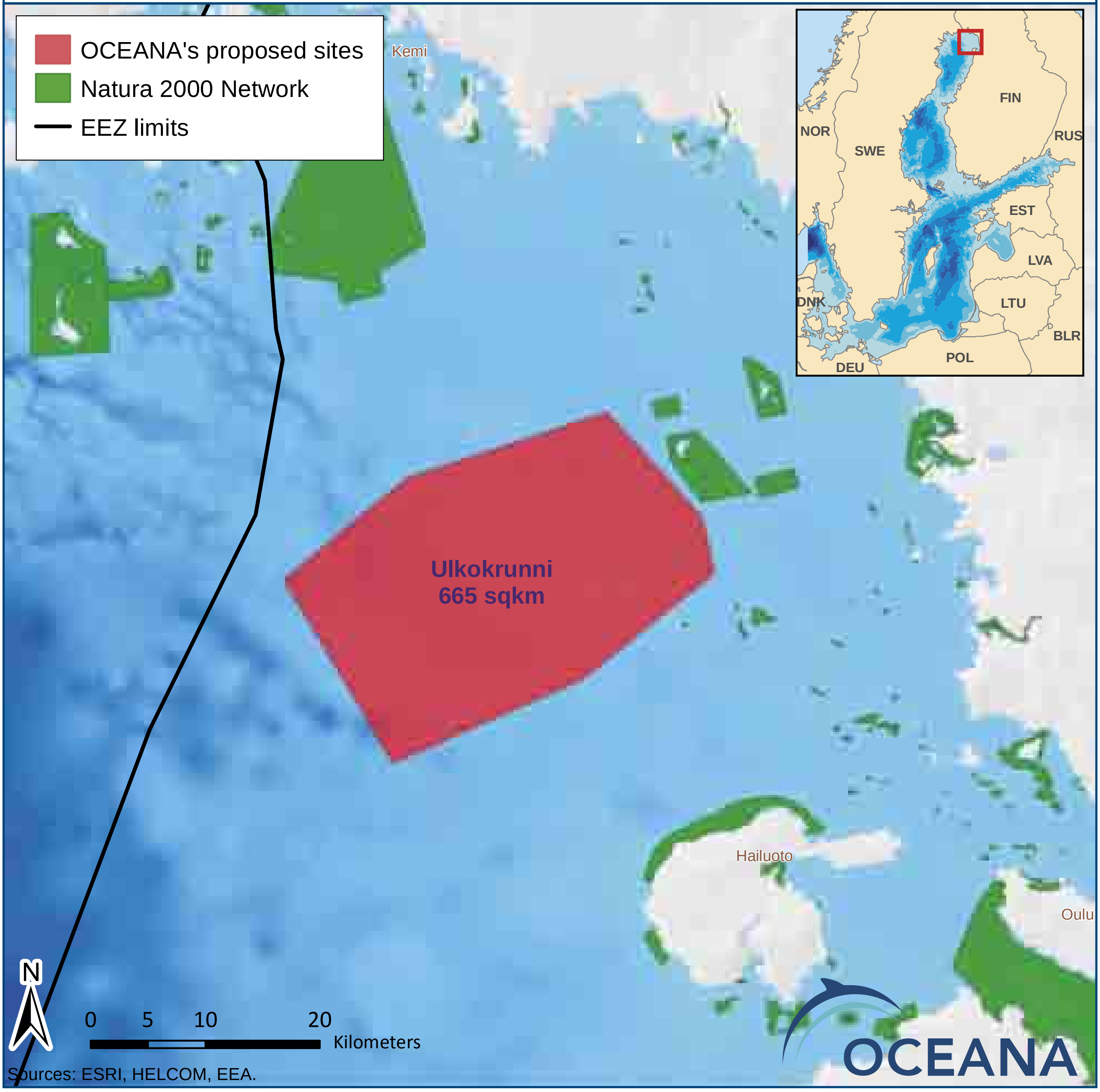
Table 17. List of habitats and communities in the Bothnian Bay deep and their threat category.

Habitat/community	Red list category
Pelagic, offshore (deep) waters	Listed as threatened by HELCOM (HELCOM 2007)
Monoporeia community	Threatened and/or declining in the Gulfs of Finland and Riga, Northern and Southern Baltic Proper (HELCOM 2007).
Saduria community	Saduria entomon is listed as threatened and/or declining in the Southern Baltic Proper (HELCOM)

5.6.2 ULKOKRUNNI | Ulkokrunni is a set of islands in the northernmost part of the Bothnian Bay. The area consists of islets and shallow waters. It is an important area for many species of birds but it is also known to host important fish like river lamprey (*Lampetra fluviatilis*) and whitefish (*Coregonus* sp.). In addition, the shallow inlets and bays are important grounds for dace (*Leuciscus leuciscus*) and roach (*Rutilus rutilus*), the offspring numbers of which can get high. The shallow sandy bottoms of the area are inhabited by sand goby (*Pomatoschistus minutus*) and small sand eels (*Ammodytes tobianus*), while the open waters are known to host perch (*Perca fluviatilis*), pike (*Esox lucius*), sea trout (*Salmo trutta*) and salmon (*Salmo salar*).

In May 2011, Oceana conducted an ROV submersion at 17 m deep and a scuba dive at 10 m deep in the sea west of the island of Ulkokrunni, with 1.5 km between the two sampling spots (Figure 13). Both recordings revealed a sand bottom with ripple marks and a few scattered stones. Many isopods (*Saduria entomon*) (see section 4.5.6) were observed during the scuba dive. *Laomedea* sp. was attached to stones as observed during the ROV sampling. Additionally, eelpout (*Zoarces viviparus*) was documented in both places (Tables 18 and 19). The benthic *Zoarces viviparus* was observed, as expected, because it is abundant in the Baltic Sea. Outside of the Ulkokrunni, Oceana registered the presence of *Z. viviparus* in several places, including the Sound, the northern Baltic Proper, the Bothnian Sea (both at offshore banks and at coastal areas), the Gulf of Finland and the Gulf of Riga. Eelpout has a broad tolerance for depth, and Oceana documented it at many different depths, from 8 meters in shallow water to 132 meters in the deepest location in the Bothnian Sea. *Z. viviparus* is live bearing and its young are also benthic. Amphipods and worms are food for eelpout (Køie & Kristensen 2000). *Zoarces viviparus* is frequently used as a study specimen for monitoring environmental quality in Kattegat and the Baltic Sea, particularly in terms of hazardous substances and pollution (Frenzilli *et al.* 2004).

Figure 13



Eelpout (*Zoarces viviparus*) at Ulkokrunni in the Bothnian Bay. © OCEANA

Sandbank in the northern Bothnian Bay. © OCEANA/ Carlos Suarez

The existing MPA near Ulkokrunni includes mainly terrestrial features, and has only one marine habitat protected (sandbank) and two coastal (coastal lagoons and estuaries) habitats protected. Oceana proposes that Finland either expand the existing Natura 2000 site (Perämeren saaret), or alternatively creates a new purely marine protected area, just off the Ulkokrunni islands, to guarantee better protection of the aquatic species and habitats of the region.

Table 18. List of species recorded in the Ulkokrunni. Possible threat category indicated in brackets.

CNIDARIANS HYDROZOANS	
Laomedea sp.	
CRUSTACEANS	
Saduria entomon	
PISCES	
Zoarces viviparus	

Table 19. List of habitats and communities in the Ulkokrunni and their threat category.

Habitat/community	Red list category
Sandbanks	Endangered (HELCOM)
Saduria community	*Saduria entomon* is listed as threatened and/or declining in the Southern Baltic Proper (HELCOM)

6. Conclusions

Nudibranch *Coryphella verrucosa*, Kattegat, Denmark. © OCEANA/ Carlos Minguell

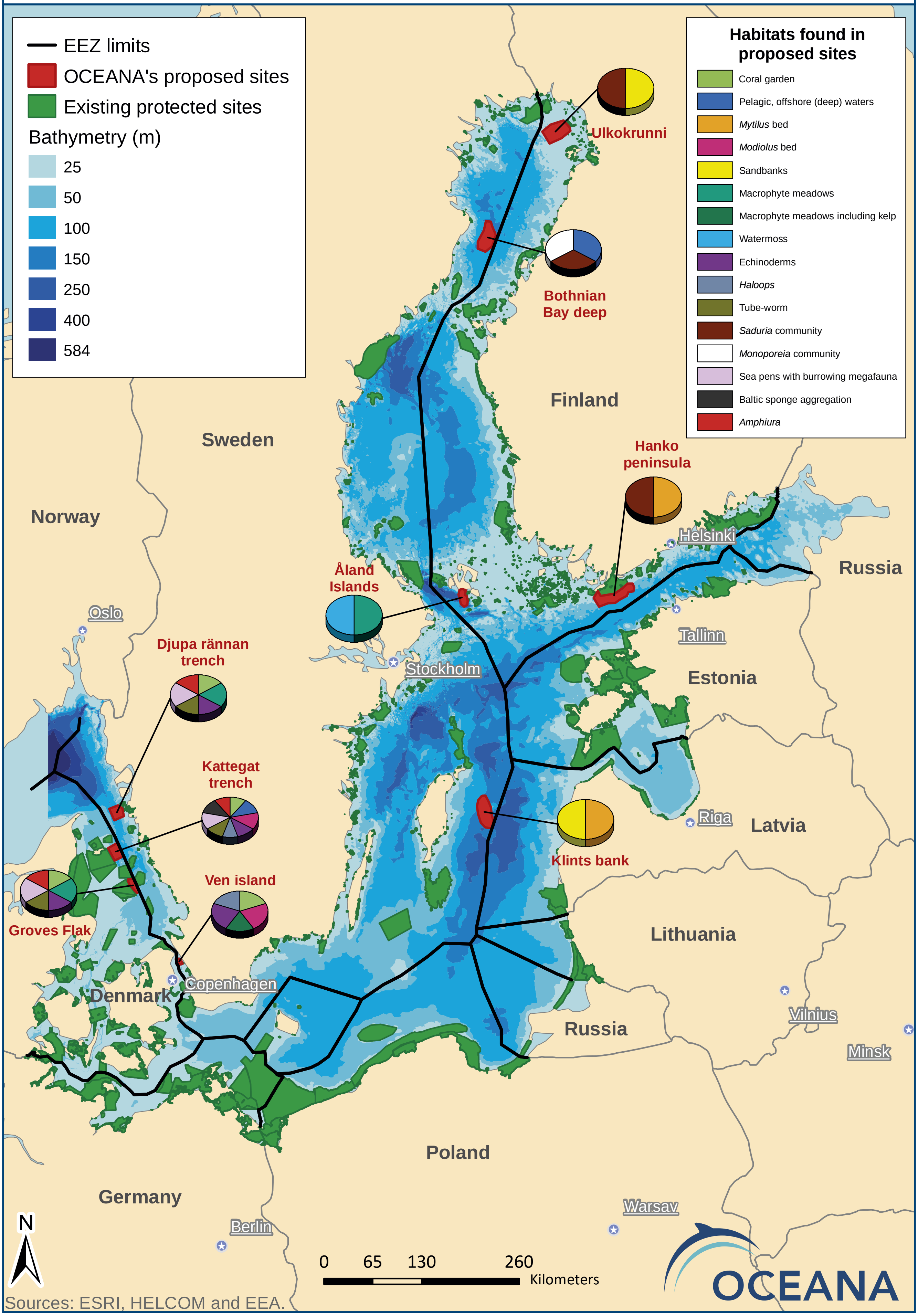
The countries surrounding the Baltic Sea have committed to creating a well-managed, ecologically coherent network of marine protected areas (HELCOM 2007, HELCOM 2010b). The minimum standards for such a network comprise that it represents a region's different habitat types, includes important places (such as spawning, feeding and resting grounds) and incorporates places with rare species. The network should also cover areas large enough to sustain ecological processes on a long-term basis. An ecologically coherent network buffers against human disturbances and increases the overall resilience of the ecosystems, enabling better and faster recovery after potentially destructive events.

Common starfish (*Asterias rubens*), Kiel Bay, Germany. © OCEANA/ Carlos Suarez

As we have shown in this report, the areas we have selected to be proposed as new marine protected areas (Figure 14) include features that are currently underrepresented in the network:

- Offshore sites in the Bothnian Bay, Baltic Proper and Kattegat;
- Deep water areas that still have healthy oxygen levels (Bothnian Bay deep, Kattegat trench);
- Areas with high and distinctive biodiversity, including declining and threatened species (the Sound, Kattegat);
- Extensions of existing protected areas to allow a full range of depths and ecosystems covered (Hanko peninsula, Ulkokrunni, Groves flak, Djupa rännan trench); and
- New sites in areas where protection is lacking (Åland Islands, Bothnian Bay).

Figure 14



EEZ limits
OCEANA's proposed sites
Existing protected sites
Bathymetry (m)
25
50
100
150
250
400
584
Habitats found in proposed sites
Coral garden
Pelagic, offshore (deep) waters
Mytilus bed
Modiolus bed
Sandbanks
Macrophyte meadows
Macrophyte meadows including kelp
Watermoss
Echinoderms
Haloops
Tube-worm
Saduria community
Monoporeia community
Sea pens with burrowing megafauna
Baltic sponge aggregation
Amphiura
Ulkokrunni
Bothnian Bay deep
Finland
Sweden
Norway
Hanko peninsula
Helsinki
Russia
Åland Islands
Oslo
Djupa rännan trench
Stockholm
Tallinn
Estonia
Kattegat trench
Riga
Latvia
Klints bank
Ven island
Groves Flak
Lithuania
Copenhagen
Denmark
Russia
Vilnius
Minsk
Poland
Germany
Warsav
Berlin
N
0 65 130 260
Kilometers
OCEANA
Sources: ESRI, HELCOM and EEA.

By incorporating Oceana's proposed areas, the total protection percentage in the Baltic Sea would increase from 12 to 13 %. However, some recent studies indicate that in order to provide comprehensive protection for the full of range of biodiversity and biological processes in the Sea, the current protected areas network coverage should be doubled at the very least (Liman *et al.* 2008, HELCOM 2010). Therefore, adding these new sites wouldn't guarantee the ecological coherency of the current network of marine protected areas, even though this is what the Baltic Sea countries aspire to. However, inclusion of the proposed sites to the existing network would be a move in the right direction as it would add features currently missing or critically underrepresented. Some of these areas have also been discussed and proposed by other organisations (see for instance Greenpeace 2004, Sørensen 2005, Goldberg & Nejrup 2010). Oceana supports these proposals and adds in new information with our findings.

There are a few different legislative measures in place to protect important marine species and habitats in the Baltic. Almost all of the marine protected areas are included in the Natura 2000 network. Also, a number of areas are protected under national laws, but those are mainly small, located on the coast and covering vast terrestrial areas. Based on our knowledge, the only truly marine national parks are in Finland, in the Bothnian Sea, and in Russian waters in the Gulf of Finland and the Baltic Proper. Therefore most of the Baltic Sea marine protected areas are governed and managed under the requirements of EU Habitats Directive.

Regardless of some of the shortcomings of the Habitats Directive lists of species and habitats of community importance, Oceana recommends protecting the marine nature of the Baltic Sea under the EU law. After this year's Natura 2000 updating round, there will be another one coming by the end of 2012. After this the intervals of updates will be synchronized with the Habitats Directive Article 17 reporting process. For each updating round, the deadline for the submission of data to the Commission will be 1 October of the year preceding the respective updating round. However, EU member states can still continue to amend their lists and propose new areas to the Natura 2000 network outside these official up-dating rounds.

When preparing management plans and measures for MPAs, Oceana recommends EU member states take into account the requirements of other EU legislation, particularly the Marine Strategy Framework Directive, which aims for the Good Environmental Status of the European seas by 2020. Through a holistic approach and vision, the creation of an ecologically coherent network of marine protected areas is one of the key tools and the implementation should be started now. Moreover, Oceana encourages countries to take proactive steps in fully implementing the HELCOM Recommendation 15/5 (HELCOM 1994) on the establishment of a Baltic Sea network of marine protected areas. This recommendation aims at protecting features important to the Baltic Sea, and at covering a wider range of species and habitats than what is currently included under EU law.

Bothnian Sea, Finland. © OCEANA/ Carlos Minguell

7. Recommendations for the better protection and management of Baltic Sea biodiversity

Nudibranch *Dendronotus frondosus*, Kattegat, Denmark. © OCEANA/ Carlos Minguell

Based on our findings during Oceana's two month expedition in the Baltic Sea, we give the following recommendations.

Recommendation 1: Make the health of the Baltic Sea a priority goal of environmental and fisheries policy. Marine Protected Areas (MPAs) have been widely accepted as a key tool to protect the world's oceans and their ecosystems. Oceana calls for the effective protection of at least 30% of the Baltic Sea. This is needed in order to restore ecosystems and to secure the future of Baltic Sea species and habitats, along with the functioning of these ecosystems on a long-term basis. The starting point should be the fulfilment of commitments undertaken at the World Summit on Sustainable Development (UN WSSD 2002) and at the Convention on Biological Diversity (CBD 2004) to create a coherent and representative network of protected areas covering a minimum of 10% of each of the world's marine regions. Correspondingly, the MSFD requires member states in Article 14, paragraph 4 to "*include spatial protection measures, contributing to coherent and representative networks of marine protected areas, adequately covering the diversity of the constituent ecosystems…*".

Although the 10% CBD target has been met in the Baltic Sea, individual countries have contributed area to the network unequally. Only Germany, Poland, Denmark and Estonia have exceeded 10% with 29.7, 24.3, 22.1 and 16.5%, respectively. And, only Germany has fulfilled the CBD target outside territorial waters, with almost 55% of its marine area outside territorial waters protected (see also Table 1 on page 17).

Cockle (*Cerastoderma* sp.), Southern Baltic Proper, Poland. © OCEANA/ Carlos Suarez

Butterfish (*Pholis gunnellus*), Western Gotland Basin, Sweden. © OCEANA/ Carlos Minguell

Apart from just reaching coverage goals, more attention should be paid to creating a coherent and representative network of MPAs. It has been shown (Liman *et al.* 2008, HELCOM 2010) that 10% areal coverage is a mere minimum, and that the creation of an ecologically coherent network of MPAs, as aspired to by the Baltic Sea governments, requires setting aside at least 30% of the marine area for protection.

Without designating more, and larger, marine protected areas, the Baltic Sea countries will not be able to fulfil the legally binding commitments mentioned above. Oceana strongly urges countries, as a first step, to nominate and designate new protected areas as proposed in this report latest October 2012.

Mussel reef in the wind energy park, the Sound, Sweden. © OCEANA/ Carlos Suarez

Recommendation 2: Marine protected areas should primarily be designated under EU law mechanisms. Because management measures are legally enforceable, Oceana recommends that to guarantee coherence particularly in fisheries management between the countries, the marine protected areas be protected within the EU Natura 2000 network. Nevertheless, Oceana urges countries to take further steps and actions in the preparation of the management plans and measures for the sites to safeguard that Baltic Sea biodiversity is sufficiently covered and protected.

Recommendation 3: *Better management of established protected areas including the creation of no-take zones*. Many Baltic Sea countries are beginning to convert their Natura 2000 SCIs (Sites of Community Interest) into SACs (Special Area of Conservation), requiring comprehensive management plans to be enforced and implemented. Thus far, there are no marine SACs in the Baltic Sea, but Member States are obliged to convert SCIs into SACs "*as soon as possible and within six years at most*" after a site has been approved as a SCI (Anon. 1992).

Oceana believes countries should not delay this process, and should proceed with management plans faster than the set six year requirement. As new information becomes available, it is recommended to amend the management plans, but lack of information cannot be used as an excuse to not manage harmful practices like destructive fisheries inside MPAs following the precautionary approach laid down in the Paragraph 2 of article 191 of the Lisbon Treaty (Anon. 2010).

Oceana calls for comprehensive management plans allowing legally enforceable protection status to the full range of biodiversity in an area with an established monitoring programme. Oceana is particularly concerned about the protection of the species and habitats not included in the Annexes of the Habitats Directive and not adequately protected by EU law. Such communities include particularly many soft bottom communities, like *Modiolus*- and *Haploops* communities. It should be ensured that management plans take into account the whole range of marine life in a protected area in the essence of HELCOM Recommendation 15/5 and the EU MSFD.

Gillnet, dead cod (*Gadus morhua*), Bay of Mecklenburg, Germany. © OCEANA/ Carlos Suarez

Marine protected areas should, in general, consist of two zones:

- No take zones: closed to fisheries and all types of human activity except scientific research activities;
- Buffer zones: only low-impact activities (artisanal fishing, scuba diving, etc.) are allowed with close management.

With the elimination of fishing, no take zones give the following benefits:

- Increase abundance and density of commercial species with reduced mobility;
- Increase average size of species, especially for long-lived species with slow growth rates and large maximum sizes;
- Recovery of shallower areas being more vulnerable to fishing pressure by both recreational and commercial fisheries;
- Improvement in quality of habitats within the reserve compared to the outside by the removal of disturbing human activities;
- Increase species size and number of species with longer migrations due to improved habitat quality and abundance of food;
- Contribution to the neighboring areas via the spillover effect.

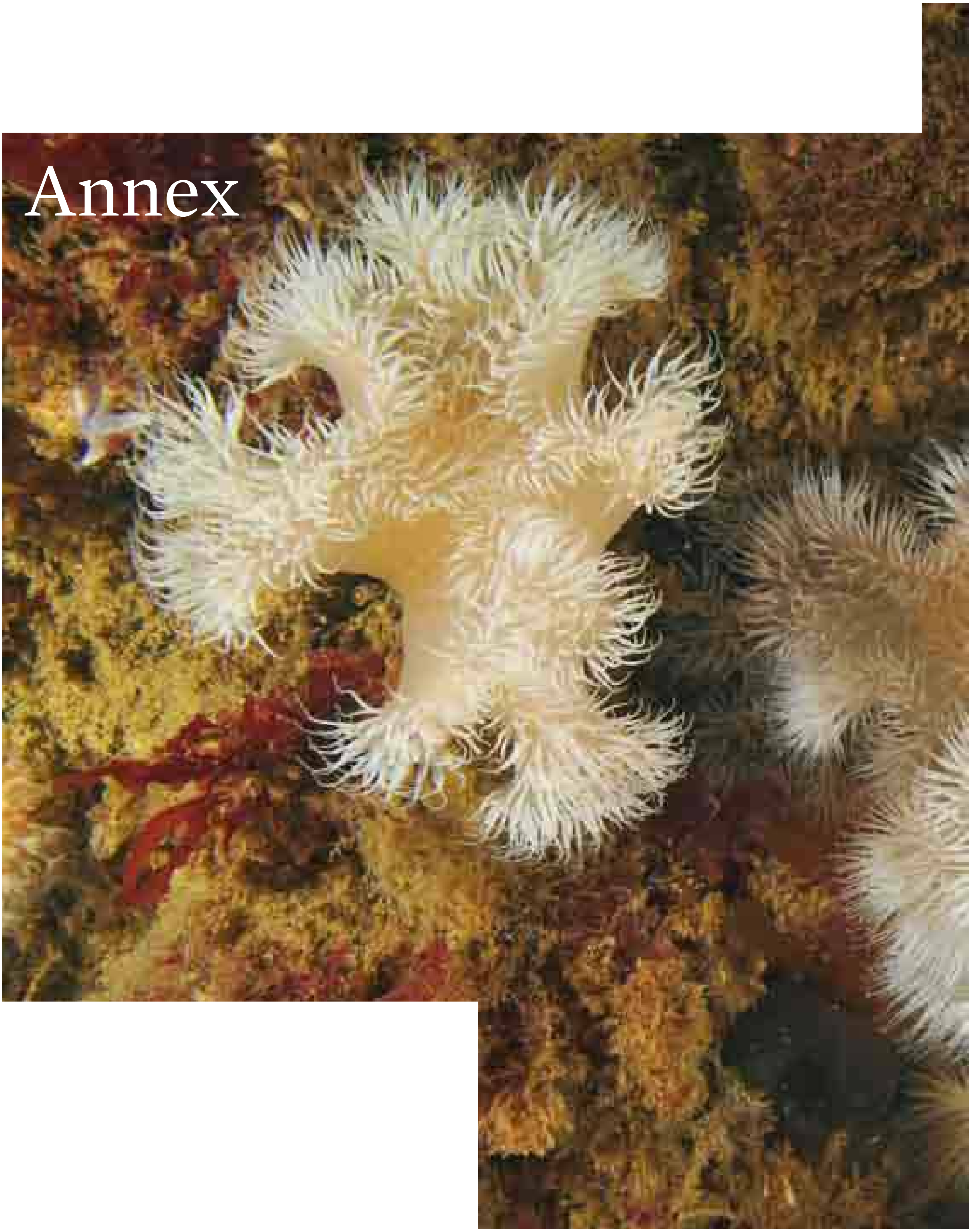
Recommendation 4: Implementation of the precautionary approach, and ecosystem-based management in the Baltic Sea. Ecosystem-based management should be applied in the entire Baltic Sea by all commercial and political sectors. Also, as required by the MSFD, priority should be placed on the achievement of Good Environmental Status and on the prevention of further deterioration. Particular activities that have a vast effect at multiple levels of the food chains, like fisheries, should be better managed both in- and outside marine protected areas to safeguard and obtain a favourable conservation status of the protected sites and the Good Environmental Status of the whole Baltic Sea. When lacking exact scientific knowledge, the precautionary approach should be applied by Member States. In particular:

In particular:

- All fisheries inside MPAs should be managed with management plans and/or quotas and monitoring, control and surveillance of fishing activities must be efficient in all marine protected areas regardless of the conservation purpose;
- Bottom trawling, dredging and other types of fishing with towed gears should be prohibited in MPAs;
- As a first step, a Vessel Monitoring System (VMS) should be obligatory for all fisheries fishing in MPAs;
- Recreational fisheries should be controlled and widely restricted inside MPAs.

Research vessel *Hanse Explorer*. © OCEANA/ Margrith Ettlin

Annex



Plumose anemones (*Metridium senile*), Kattegat, Denmark. © OCEANA/ Carlos Minguell

This table lists the Baltic Sea Natura 2000 sites for which conservation aims include marine features from the Annex I and/or II of the Habitats Directive. Information was collected from EUNIS database, Natura 2000 standard data forms, Commission Decisions, HELCOM's BSPA database (marine protected areas in Russian waters) and Danish nature plans. In addition, countries were sent a query about marine management and in particular fisheries management inside protected areas.

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Denmark				
Davids Banke	SCI	DK00VA308	12/07/2004	No
Skælskør Fjord og havet og kysten mellem Agersø og Glænø	SCI/SPA	DK005Y229	7/12/2004 (N/A)	No
Stavns Fjord, Samsø Østerflak og Nordby Hede	SCI/SPA	DK00DX155	7/12/2004 (N/A)	No
Hesselø med omliggende stenrev	SCI	DK003X202	12/07/2004	No
Store Middelgrund	SCI	DK00VA250	12/07/2004	No
Ålborg Bay, Randers Fjord and Mariager Fjord	SCI/SPA	DK00FX122	7/12/2004 (N/A)	No
Strandenge på Læsø og havet syd herfor	SCI/SPA	DK00FX010	7/12/2004 (N/A)	No
Hirsholmene, havet vest herfor og Ellinge Å's udløb	SCI/SPA	DK00FX113	7/12/2004 (N/A)	No
Læsø Trindel og Tønneberg Banke	SCI	DK00VA249	12/07/2004	No
Hertha's Flak	SCI	DK00VA248	12/07/2004	No
Ertholmene	SCI/SPA	DK007X079	7/12/2004 (1/5/1983)	No
Kirkegrund	SCI	DK00VA235	12/07/2004	No
Havet og kysten mellem Karrebæk Fjord og Knudshoved Odde	SCI/SPA	DK006X234	7/12/2004 (N/A)	No
Smålandsfarvandet nord for Lolland, Guldborg Sund, Bøtø Nor og Hyllekrog-Rødsand	SCI/SPA	DK006X238	7/12/2004 (N/A)	No
Havet omkring Nordre Rønner	SCI/SPA	DK00FX257	7/12/2004 (N/A)	No
Æbelø, havet syd for og Nærå	SCI/SPA	DK008X184	7/12/2004 (N/A)	No
Anholt og havet nord for	SCI/SPA	DK00DX146	7/12/2004 (N/A)	No
Bakkebrædt and Bakkegrund	SCI	DK00VA310	12/07/2004	No
Begtrup Vig og kystområder ved Helgenæs	SCI	DK00DX151	12/07/2004	No
Bøchers Grund	SCI	DK00VA307	12/07/2004	No
Broen	SCI	DK00VA256	12/07/2004	No
Centrale Storebælt og Vresen	SCI/SPA	DK008X190	7/12/2004 (N/A)	No
Flensborg Fjord, Bredgrund og farvandet omkring Als	SCI/SPA	DK00VA254	7/12/2004 (N/A)	No
Fyns Hoved, Lillegrund og Lillestrand	SCI	DK008X183	12/07/2004	No
Hatter Barn	SCI	DK00VA255	12/07/2004	No
Maden på Helnæs og havet vest for	SCI	DK008X198	12/07/2004	No
Horsens Fjord, havet øst for og Endelave	SCI/SPA	DK00DY156	7/12/2004 (N/A)	No
Hvideodde Rev	SCI	DK00VA309	12/07/2004	No
Kims Top og den Kinesiske Mur	SCI	DK00VA247	12/07/2004	No
Klinteskoven og Klinteskov kalkgrund	SCI	DK00VA306	12/07/2004	No
Lillebælt	SCI/SPA	DK008X047	7/12/2004 (N/A)	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
Marine	Management plans under preparation for all sites. For sites with bubbling reefs a new fishery measure is launched: a buffer zone of 240 meters around a bubbling reef has trawling ban. The current nature plans for all marine sites contain the following informations: Threats: fishery with trawling gears, thereby creating a physical destruction of the marine habitats, partly by removing the bottom flora and benthic fauna, and partly by the removal of hard bottom, rocks and shells. Fishery is a threat towards reefs and bubbling reefs, and can be a threat towards sandbanks and bays. Fishery with fixed gear is a threat to bubbling reefs, as the gears can hook onto the bubling reef, and subsequent tear, break, or topple concreate bubbling reef structures. Fishery is considered as a threat to harbour porpoises, as the animals can be trapped and drowned in the nets. The extent of the current fishery is not known. For few sites stone fishery was earlier permitted, and this had a negative impact on the flora and fauna. For selected sites disturbances from recreational fishing, kayakers etc. can be a threat towards seals and harbour porpoise. Status: (varies from site to site) The status for reefs and bubbling reefs are unfavorable (or unknown), partly due to trawling fishery, and also due to fixed gear for bubbling reefs. Status for sandbank and bay are unfavorable (or unknown), and the fishery impact on these nature types is unknown. Status is unfarvorable for harbour porpoises, partly due to bycatch. Status is unfarvorable for harbour seals, due to disturbances and reduced food resources. Interventions: for marine nature types and species it shall be ensured that activities do not harm them. Secure protection against destruction of reefs and bubbling reefs.
All	
All	
All	
Marine	
All	
All	
All	
Marine	
Marine	
All	
Marine	
All	
All	
Marine	
All	
All	
Marine	
All	
Marine	
Marine	
All	
Marine	
All	
Marine	
All	
All	
Marine	
Marine	
All	
All	

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	Type (SCI/SPA/SAC/other)	N2K code	Date confirmed as SCI, classified as SPA	Management plan (yes/no)
Lysegrund	SCI	DK00VA299	12/07/2004	No
Mols Bjerge med kystvande	SCI	DK00DX300	12/07/2004	No
Munkegrunde	SCI	DK00VA304	12/07/2004	No
Nakskov Fjord og Indrefjord	SCI/SPA	DK006X242	7/12/2004 (N/A)	No
Havet og kysten mellem Præstø Fjord og Grønsund	SCI/SPA	DK006X233	7/12/2004 (N/A)	No
Havet mellem Romsø og Hindsholm samt Romsø	SCI/SPA	DK008X185	7/12/2004 (N/A)	No
Ryggen	SCI	DK00VA253	12/07/2004	No
Schultz og Hastens Grund samt Briseis Flak	SCI	DK00VA303	12/07/2004	No
Sejerø Bugt og Saltbæk Vig	SCI / SPA	DK005X221	7/12/2004 (N/A)	No
Stenrev sydøst for Langeland	SCI	DK00VA200	12/07/2004	No
Stevns Rev	SCI	DK00VA305	12/07/2004	No
Sydfynske Øhav	SCI/SPA	DK008X201	7/12/2004 (N/A)	No
Thurø Rev	SCI	DK008X329	12/07/2004	No
Bøjden Nor	SCI	DK008X197	12/07/2004	No
Ebbeløkke rev	SCI	DK00VA330	12/07/2004	No
Ølsemagle Strand og Staunings Ø	SCI	DK004X217	12/07/2004	No
Jægerspris Skydeterræn	SCI	DK003X297	12/07/2004	No
Kaløskovene og Kaløvig	SCI	DK00DX321	12/07/2004	No
Kobberhage kystarealer	SCI	DK00DX322	12/07/2004	No
Odense Fjord	SCI/SPA	DK008X075	7/12/2004 (1/5/1983)	No
Røsnæs, Røsnæs Rev og Kalundborg Fjord	SCI	DK005X276	12/07/2004	No
Roskilde Fjord og Jægerspris Nordskov	SCI/SPA	DK003X209	7/12/2004 (N/A)	No
Stege Nor	SCI	DK006X260	12/07/2004	No
Udby Vig	SCI	DK005X222	12/07/2004	No
Vestlige del af Avernakø	SCI	DK008X199	12/07/2004	No
Mejl Flak	SCI	DK00VA170	01/10/2011	No
Adler Grund og Rønne Banke	SCI	DK00VA261	01/10/2011	No
Femern Bælt	SCI	DK00VA260	01/10/2011	No
Gilleleje Flak og Tragten	SCI	DK00VA171	01/10/2011	No
Saltholm og omliggende hav	SCI/SPA	DK002X110	7/12/2004 (1/5/1983)	No
Havet og kysten mellem Hundested og Rørvig	SCI/SPA	DK005Y220	7/12/2004 (N/A)	No
Vestamager og havet syd for	SCI/SPA	DK002X111	7/12/2004 (1/5/1983)	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
Marine	Management plans under preparation for all sites. For sites with bubbling reefs a new fishery measure is launched: a buffer zone of 240 meters around a bubbling reef has trawling ban. The current nature plans for all marine sites contain the following informations: Threats: fishery with trawling gears, thereby creating a physical destruction of the marine habitats, partly by removing the bottom flora and benthic fauna, and partly by the removal of hard bottom, rocks and shells. Fishery is a threat towards reefs and bubbling reefs, and can be a threat towards sandbanks and bays. Fishery with fixed gear is a threat to bubbling reefs, as the gears can hook onto the bubling reef, and subsequent tear, break, or topple concreate bubbling reef structures. Fishery is considered as a threat to harbour porpoises, as the animals can be trapped and drowned in the nets. The extent of the current fishery is not known. For few sites stone fishery was earlier permitted, and this had a negative impact on the flora and fauna. For selected sites disturbances from recreational fishing, kayakers etc. can be a threat towards seals and harbour porpoise. Status: (varies from site to site) The status for reefs and bubbling reefs are unfavorable (or unknown), partly due to trawling fishery, and also due to fixed gear for bubbling reefs. Status for sandbank and bay are unfavorable (or unknown), and the fishery impact on these nature types is unknown. Status is unfarvorable for harbour porpoises, partly due to bycatch. Status is unfarvorable for harbour seals, due to disturbances and reduced food resources. Interventions: for marine nature types and species it shall be ensured that activities do not harm them. Secure protection against destruction of reefs and bubbling reefs.
All	
Marine	
All	
All	
All	
Marine	
Marine	
All	
Marine	
All	
All	
All	
Marine	
Marine	
Marine	
All	
All	
All	
All	
All	
All	
All	
All	
All	
Marine	Nature plan will be prepared under second plan period
Marine	
Marine	
Marine	
All	Fishing with bottom trawling gear has not been allowed in the Sound since 1932. Management plan under preparation. Nature plan: Status: Assessment for conservation status is unknown for fishery efforts. Interventions: It shall be ensured that activities do not harm or have major impact on the presence of seals.
All	Mussel fishery is banned at water depths under 4 meters. Management plan under preparation. Nature plan: Threats: Fishery with trawling gear, thereby creating a physical destruction of the marine nature types, partly by removing the bottom flora and benthic fauna, and partly by the removal of hard bottom, rocks and shells, is a threat. Mussel fishery will reduce the food resource for eiders. Status: it is not known if mussel fishing is going on in the deeper parts of the habitat area at the eelgrass current depth limit. Interventions: For the marine nature types it shall be ensured that projects and activities do not harm the locality.
All	Fishery with bottom trawling gear is not allowed in the Sound since 1932. Management plan under preparation. Nature plan: Status: Assessment for conservation status is unknown for fishery efforts. Interventions: It shall be ensured that activities do not harm or have major impact on the presence of seals.

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Estonia				
Lahemaa	SCI/SPA	EE0010173	01/09/2009 (01/04/2004)	No
Hiiu Madala	SCI	EE0040129	01/09/2009	Partly
Hiiu Madala (Paope)	SCI	EE0040112	01/09/2009	Partly
Hiiu Madala (Kõrgessaare-Mudaste)	SPA	EE0040130	01/04/2004	Partly
Vilsandi (Tagamõisa)	SCI/SPA	EE0040476	01/09/2009 (01/04/2004)	No
Vilsandi	SCI/SPA	EE0040496	01/09/2009 (01/04/2004)	No
Pärnu lahe	SPA	EE0040346	01/04/2004	No
Pärnu lahe (Luitemaa)	SPA/SCI	EE0040351	01/04/2004	No
Pärnu lahe (Tõstamaa)	SCI	EE0040363	01/09/2009	No
Kura Kurk (Kaugatoma-Lõu)	SCI/SPA	EE0040441	01/02/2009 (01/04/2004)	No
Kura Kurk	SPA	EE0040434	01/04/2004	No
Kura Kurk (Vesitükimaa)	SCI	EE0040490	01/02/2009	No
Kura Kurk (Allirahu)	SCI	EE0040402	01/02/2009	No
Kura Kurk (Kerju)	SCI	EE0040421	01/02/2009	No
Pakri	SCI/SPA	EE0010129	01/02/2009 (01/04/2009)	Yes
Väinameri	SPA	EE0040001	01/04/2009	No
Väinameri	SCI	EE0040486	01/02/2009	No
Finland				
Perämeren kansallispuisto	SCI	FI1300301	13/01/2005	No
Perämeren saaret	SCI	FI1300302	13/01/2005	Yes
Iijoen suisto	SCI	FI1100601	13/01/2005	N/A
Hiastinlahti	SCI/SPA	FI1100600	13/01/2005	N/A
Liminganlahti	SCI/SPA	FI1102200	13/01/2005	Yes
Isomatala - Maasyvänlahti	SCI	FI1100203	13/01/2005	No
Hailuoto, pohjoisranta	SCI	FI1100201	13/01/2005	No
Kirkkosalmi	SCI	FI1100202	13/01/2005	No
Saarenperä ja karinkannanmatala	SCI	FI1105201	13/01/2005	N/A
Siikaljoen lintuvedet ja suot	SCI/SPA	FI1105202	13/01/2005	N/A
Raahen saaristo	SCI	FI1104600	13/01/2005	Yes
Rahjan saaristo	SCI/SPA	FI1000005	13/01/2005	Yes
Vattajanniemi	SCI	FI1000017	13/01/2005	Yes
Kokkolan saaristo	SPA	FI1000033		No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation and will be ready in 2012
N/A	Fisheries management measures/restrictions: N/A Management plan will be finalised 2012
N/A	
N/A	
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation and will be ready in 2012
N/A	
N/A	Fisheries management measures/restrictions: N/A Management plan to be prepared after 2013
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: Yes Measures and information on fisheries exists but no restrictions
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation and will be ready in 2012
N/A	
N/A	Fisheries management measures/restrictions: No Management plan underpreparation. The draft management plan states that possibilities for commercial and crecreational fishing will be secured
Terrestrial	Fisheries management measures/restrictions: No The management plan states that possibilities for commercial and crecreational fishing will be secured
N/A	N/A
N/A	N/A
Coastal, terrestrial	Fisheries management measures/restrictions: No Important bird wetland
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation
N/A	
N/A	
N/A	
N/A	N/A
Terrestrial	No
N/A	Fisheries management measures/restrictions: N/A New management plan under preparation
Terrestrial	Fisheries management measures/restrictions: No Sand bottoms are considered to be important areas for whitefish and herring spawning. Also vendace is spawning in the area. Fishing is allowed, and besides the mentioned species, also sea trout is caught. In addition military uses the area for live ammunition firing.
N/A	Fisheries management measures/restrictions: N/A Bird protection area, management plan under preparation

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Luodon saaristo	SCI	FI0800132	13/01/2005	No
Uudenkaarlepyyn saaristo	SCI	FI0800133	13/01/2005	Yes
Merenkurkun saaristo	SCI/SPA	FI0800130	13/01/2005	No
Närpiön saaristo	SCI	FI0800135	13/01/2005	No
Kristiinankaupungin saaristo	SCI	FI0800134	13/01/2005	No
Ouran saaristo	SCI	FI0200077	13/01/2005	No
Pooskerin saaristo	SCI	FI0200076	13/01/2005	No
Kasalanjokisuu	SCI	FI0200033	13/01/2005	No
Gummandooran saaristo	SCI	FI0200075	13/01/2005	No
Preiviikinlahti	SCI	FI0200080	13/01/2005	No
Luvian saaristo	SCI	FI0200074	13/01/2005	No
Rauman saaristo	SCI	FI0200073	13/01/2005	No
Uudenkaupungin saaristo	SCI	FI0200072	13/01/2005	No
Seksmiilarin saaristo	SPA	FI0200152	01/10/1996	No
Kokemäenjoen suisto	SCI/SPA	FI0200079	13/01/2005	N/A
Yttersberg	SCI	FI1400031	13/01/2005	No
Rannö	SCI	FI1400064	13/01/2005	No
Vikarskären	SCI	FI1400067	13/01/2005	No
Idskär - Mellanskär - Skatan	SCI	FI1400039	13/01/2005	No
Läggningsbådan	SPA	FI1400048	01/10/1997	
Märrkallarna - Åbergsgrynnan - Mjölskärskallen	SCI	FI1400035	13/01/2005	No
Signilskär - Märket	SCI	FI1400047	13/01/2005	No
Långör - Östra Sundskär	SCI/SPA	FI1400042	13/01/2005	No
Björkör	SCI/SPA	FI1400006	13/01/2005	No
Lågskär	SCI/SPA	FI1400058	13/01/2005	No
Klåvskär	SPA	FI1400040	01/10/1997	No
Karlbybådar	SCI	FI1400055	13/01/2005	No
Långskär - Sandskär	SCI	FI1400010	13/01/2005	No
Blåskären - Salungarna - Stora Bredgrundet	SCI	FI1400012	13/01/2005	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	Fisheries management measures/restrictions: No Commercial and recreational fisheries takes place in the area. Local fishing municipalities have closed certain areas form fisheries inside the protected area either completely or temporarily.
Terrestrial	N/A
N/A	Fisheries management measures/restrictions: N/A Management plan is being finalized. Area is important for whitefish and grayling spawning. Salmon also regularly occurs in the area. Commercial fishing takes place.
N/A	N/A
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A Development of the management plan started August 2011. Part of the Bothnian Sea national park.
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists. Bottom trawling banned in part of the area.
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists. Commercial fishing may be permitted throughout the year with special permission from the authorities.
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists. Important bird area. Commercial fishing may be permitted throughout the year with special permission from the authorities.
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists. Important bird area
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists. A seal sanctuary, entering the area is prohibited.
All	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. Commercial fisheries is allowed through-out the year. Between July 16 until March 31 also recreational fishing is allowed.
All	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. Commercial fisheries is allowed through-out the year. Between July 16 until March 31 also recreational fishing is allowed.

OCEANA

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Pakinaisten saaristo	SCI	FI0200065	13/01/2005	N/A
Seilin saaristo	SCI	FI0200064	13/01/2005	N/A
Mörskär	SCI	FI1400054	13/01/2005	N/A
Saaristomeri	SCI	FI0200090	13/01/2005	Yes
Tulliniemen linnustonsuojelualue	SCI/SPA	FI0100006	13/01/2005	No
Tammisaaren ja Hangon saariston ja Pohjanpitäjänlahden merensuojelualue	SCI	FI0100005	13/01/2005	No
Inkoon saaristo	SCI	FI0100017	13/01/2005	N/A
Kallbådanin luodot ja vesialue	SCI	FI0100089	13/01/2005	Yes
Kirkkonummen saaristo	SCI	FI0100026	13/01/2005	No
Söderskärin ja Långörenin saaristo	SCI	FI0100077	13/01/2005	No
Pernajanlahtien ja Pernajan saariston merensuojelualue	SPA	FI0100078	01/08/1996	Partly
Itäisen Suomenlahden saaristo ja vedet	SCI	FI0408001	13/01/2005	No
Selkämeren kansallispuisto	National park	n/a	01/07/2011	No
Germany				
Adlergrund	SCI	DE1251301	13/11/2007	No
Fehmarnbelt	SCI	DE1332301	13/11/2007	No
Kadetrinne	SCI	DE1339301	13/11/2007	No
Westliche Rönnebank	SCI	DE1249301	13/11/2007	No
Pommersche Bucht mit Oderbank	SCI	DE1652301	13/11/2007	No
Küstenbereiche Flensburger Förde von Flensburg bis Geltinger Birk	SCI	DE1123393	13/11/2007	No
NSG Schwansener See	SCI/SPA	DE1326301	7/12/2004 (1/3/1992)	No
Schlei incl. Schleimünde und vorgelagerter Flachgründe	SCI	DE1423394	13/11/2007	No
Südküste der Eckernförder Bucht und vorgelagerte Flachgründe	SCI	DE1526391	13/11/2007	No
Küstenlandschaft Bottsand - Marzkamp u. vorgelagerte Flachgründe	SCI	DE1528391	13/11/2007	No
Staberhuk	SCI	DE1533301	12/07/2004	No
Meeresgebiet der östlichen Kieler Bucht	SCI	DE1631392	13/11/2007	No
Küstenlandschaft vor Grossenbrode und vorgelagerte Meeresbereiche	SCI	DE1632392	13/11/2007	No
Sagas-Bank	SCI	DE1733301	12/07/2004	No
Walkyriengrund	SCI	DE1832322	13/11/2007	No
Strandniederunged südlich Neustadt	SCI	DE1930330	13/11/2007	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	N/A
N/A	N/A
N/A	N/A
N/A	No
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation
All	Fisheries management measures/restrictions: No The management plan is being reinforced by the Ministry of Environment. There are seven commercial fishermen fishing in the area with 165 nets. In addition local residents can buy fishing permits for maximum three nets/ person.
N/A	N/A
All	Fisheries management measures/restrictions: No Grea seal sanctuary
N/A	Fisheries management measures/restrictions: No A separate fisheries management plan prohibits all fishing around the islands of Stora Tallholmen and Tjuvholmen.
N/A	Fisheries management measures/restrictions: N/A Management plan under preparation
N/A	Fisheries management measures / restrictions: No Small part of the area is covered with a management plan.
N/A	Fisheries management measures/restrictions: N/A Management plan under development. The proposal allows both commercial and recreational fishing. There are 118 commercial fishermen in the area.
N/A	Fisheries management measures/restrictions: N/A Management plan preparation started. The first drafts indicate that fishing and hunting of seals won't be prohibited.
Marine	Fisheries management measures/restrictions: N/A Proposed fisheries measures: Exclusion of fisheries with mobile bottom-contacting gears in sandbanks and reef areas. Measures for harbour porpoises could be a year-round exclusion of fisheries with gillnets and entangling nets in the entire area, and/or a year-round use of pingers on all gillnets and entangling nets irrespective of vessel size.
Marine	
Marine	
Marine	
Marine	
All	Fisheries management measures/restrictions: N/A Management plan under preparation.
All	
All	
All	
All	
All	
Marine	
Coastal	
Marine	
Marine	
Coastal	

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Ostseeküste am Brodtener Ufer	SCI/SPA	DE1931301	7/12/2004 (1/8/2000)	No
Travelförde und angrenzende Flächen	SCI	DE2030392	13/11/2007	No
Plantagenetgrund	SCI	DE1343301	22/12/2009	No
Erweiterung Libben, Steilküste und Blockgründe Wittow und Arkona	SCI	DE1345301	22/12/2009	No
Steilküste und Blockgründe Wittow	SCI	DE1346301	12/07/2004	No
Jasmund	SCI	DE1447302	13/11/2007	No
Darsser Schwelle	SCI	DE1540302	22/12/2009	No
Darss	SCI	DE1541301	13/11/2007	No
Recknitz-Ästuar und Habinsel Zingst	SCI	DE1542302	13/11/2007	No
Westrügensche Boddenlandschaft mit Hiddensee	SCI	DE1544302	13/11/2007	No
Granitz	SCI	DE1647303	12/07/2004	No
Küstenlandschaft Südostrügen	SCI	DE1648302	13/11/2007	No
Greifswalder Bodden, Teile des Strelasundes und Nordspitze Usedom	SCI	DE1747301	13/11/2007	No
Greifswalder Oie	SCI	DE1749301	12/07/2004	No
Greifswalder Boddenrandschwelle und Teile der Pommerschen Bucht	SCI	DE1749302	22/12/2009	No
Riedensee	SCI	DE1836301	12/07/2004	No
Stoltera bei Rostock	SCI	DE1838301	13/11/2007	No
Wismarbucht	SCI	DE1934302	13/11/2007	No
Erweiterung Wismarbucht	SCI	DE1934303	22/12/2009	No
Küste Klützer Winkel und Ufer von Dassower See und Trave	SCI	DE2031301	13/11/2007	No
Latvia				
Kemeru nacionalais parks	SCI/SPA	LV0200200	12/11/2007 (1/5/2004)	No
Sliteres nacionalais parks	SCI/SPA	LV0200300	12/11/2007 (1/5/2004)	No
Piejura	SCI/SPA	LV0301700	12/11/2007 (1/5/2004)	No
Engures ezers	SCI/SPA	LV0302800	12/11/2007 (1/5/2004)	No
Pape	SCI/SPA	LV0303500	12/11/2007 (1/5/2004)	No
Bernati	SCI	LV0303600	11/12/2007	No
Vidzemes akmenaina jurmala	SCI	LV0508600	11/12/2007	No
Randu Plavas	SCI/SPA	LV0509100	12/11/2007 (1/5/2004)	No
Uzava	SCI/SPA	LV0520300	12/11/2007 (1/5/2004)	No
Lithuania				
Baltijos juros priekrante	SCI	LTPAL0001	11/12/2007	No
Kursiu nerija	SCI	LTNER0005	11/12/2007	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
All	Fisheries management measures/restrictions: N/A Management plan under preparation.
Coastal	
Marine	
Marine	
All	
All	
Marine	
Coastal	
Coastal	
Coastal	
All	
All	
All	
All	
Marine	
Coastal	
All	
All	
Marine	
Coastal	
All	Fisheries management measures/restrictions: N/A No plans for making management plans for fishery specially designed for Natura 2000 sites.
All	
All	
All	
All	
All	
All	
All	
All	
Marine	Other Member States vessels do not fish in Lithuanian marine Natura 2000 areas. The site is partly overlapping with SPA LTPALB001, which have the following fishery measures: "In the reserve is forbidden to place fishing nets which have 55 mm or bigger mesh size in the depth where the distance from the upper edge of the net till water surface is less than 15 metres from the 16 of November till 15 of April".
All	Other Member States vessels do not fish in Lithuanian marine Natura 2000 areas. The site is designated for the protection of twaid shad *Alosa fallax*.

OCEANA

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Poland				
Ławica Słupska	SCI/SPA	PLC990001	12/12/2008 (1/7/2004)	No
Ostoja Słowińska	SCI	PLH220023	13/11/2007	No
Zatoka Pucka i Półwysep Helski	SCI	PLH220032	13/11/2007	No
Ostoja w Ujściu Wisły	SCI	PLH220044	12/12/2008	No
Trzebiatowsko-Kołobrzeski Pas Nadmorski	SCI	PLH320017	13/11/2007	No
Wolin i Uznam	SCI	PLH320019	13/11/2007	No
Jezioro Kopań	SCI	PLH320059	01/10/2011	No
Ostoja na Zatoce Pomorskiej	SCI	PLH990002	12/12/2008	No
Russian Federation				
Ingermanlandskiy	Other		13/07/2005	No
Curonian Spit State National Park (southern part)	Other		13/07/2005	No
Vistula Spit Landscape Park (northern part)	Other		13/07/2005	N/A
Kurgalskiy Peninsula	Other		01/04/2009	Yes
Berezovye Island	Other		30/03/2009	Yes
Lebyazhy Nature Reserve	Other			Yes
Vyborgskii	Other			N/A
Sweden				
Haparanda Sandskär	SCI	SE0820320	13/01/2005	N/A
Haparanda skärgård	SCI	SE0820108	13/01/2005	N/A
Björn	SCI	SE0820300	13/01/2005	N/A
Torne-Furö	SCI	SE0820310	13/01/2005	N/A
Malören	SCI	SE0820724	13/01/2005	N/A
Kalix yttre skärgård	SCI	SE0820327	13/01/2005	N/A
Likskär	SCI	SE0820303	13/01/2005	N/A
Båtöfjärden	SCI	SE0820313	13/01/2005	N/A
Harufjärden	SCI	SE0820314	13/01/2005	N/A
Bergöfjärden	SCI	SE0820323	13/01/2005	N/A
Rånefjärden	SCI	SE0820704	13/01/2005	N/A
Kluntarna	SCI	SE0820306	13/01/2005	N/A
Norr-Äspen	SCI	SE0820307	13/01/2005	N/A
Marakallen	SCI	SE0820751	01/07/2008	N/A
Rödkallen-SörÄspen	SCI	SE0820035	13/01/2005	N/A
Bådan	SCI	SE0820304	13/01/2005	N/A
Patta Peken	SCI	SE0820329	13/01/2005	N/A
Vargön	SCI	SE0820631	13/01/2005	N/A
Vargödraget	SCI	SE0820330	13/01/2005	N/A
Mellerstön	SCI	SE0820630	13/01/2005	N/A

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
Marine	Fisheries management measures/restrictions: N/A No plans for making management plan.
All	Fisheries management measures/restrictions: N/A Extension of existing site by 2012. Management plan will be ready by 2014.
All	
All	Fisheries management measures/restrictions: N/A Management plan will be ready by 2014.
All	
All	
All	
Marine	
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Stor-Rebben	SCI	SE0820004	13/01/2005	N/A
Jävreholmen	SCI	SE0820629	13/01/2005	N/A
Skötgrunnan	SCI	SE0810035	13/01/2005	Yes
Bjuröklubb	SCI	SE0810034	13/01/2005	Yes
Hertsånger	SCI	SE0810033	13/01/2005	Yes
Rataskär	SCI	SE0810031	13/01/2005	Yes
Holmöarna	SCI	SE0810010	13/01/2005	Yes
Ostnäs	SCI	SE0810365	13/01/2005	Yes
Skeppsviksskärgården	SCI	SE0810011	13/01/2005	Yes
Strömbäck-Kont	SCI	SE0810009	13/01/2005	Yes
Snöanskärgården	SCI	SE0810003	13/01/2005	Yes
Bonden	SCI	SE0810002	13/01/2005	Yes
Kronören	SCI	SE0810001	13/01/2005	Yes
Utstenarna	SCI	SE0810076	13/01/2005	Yes
Röjtingssundet	SCI	SE0810407	13/01/2005	Yes
Brönsnäsviken	SCI	SE0810408	13/01/2005	Yes
Långstranden	SCI	SE0810409	13/01/2005	Yes
Storsand	SCI	SE0810431	13/01/2005	Yes
Kågefjärdens havsstrandängar	SCI	SE0810440	13/01/2005	Yes
Skallön	SCI	SE0810441	13/01/2005	Yes
Killingsanden	SCI	SE0810453	13/01/2005	Yes
Klubben-Rickleån	SCI	SE0810456	13/01/2005	Yes
Umeälvens delta och slätter	SCI	SE0810475		Yes
Umeälvens delta	SCI	SE0810491	13/01/2005	Yes
Sävaråns utlopp	SPA	SE0810506	01/04/2004	Yes
Tavlefjärden	SCI	SE0810518	01/07/2010	Yes
Sydostbrotten	SCI	SE0810519		Yes
Bjuren	Other			Yes
Innerviksfjärden	Other			Yes
Stora Tuvan	Other			Yes
Trysunda	SCI	SE0710056	13/01/2005	No
Stormyran på Ulvön	SCI	SE0710182	13/01/2005	No
Högbonden	SCI	SE0710042	13/01/2005	No
Vänta Litets Grund	SCI	SE0710225		No

Coverage (marine/ terrestrial/coastal/all)	Fisheries management measures/restrictions and other remarks
N/A	N/A
N/A	N/A
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling.
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No Area was part of a pilot study looking for possible fisheries management measures inside Natura 2000 sites. In the Västerbotten county there is no bottom trawling.
N/A	Fisheries management measures/restrictions: Yes A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling. In Bonden fishing with nets and longlines is prohibited because of birds and seals.
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling.
N/A	
N/A	Fisheries management measures/restrictions: No In the Västerbotten county there is no bottom trawling.
N/A	
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling.
N/A	Fisheries management measures/restrictions: No In the Västerbotten county there is no bottom trawling.
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling.
N/A	Fisheries management measures/restrictions: No In the Västerbotten county there is no bottom trawling.
N/A	
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan. In the Västerbotten county there is no bottom trawling.
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Gran	SCI	SE0630173	13/01/2005	No
Agön-Kråkön	SCI	SE0630068	13/01/2005	No
Drakön-Tihällan	SCI	SE0630069	13/01/2005	No
Långvind	SCI	SE0630139	13/01/2005	No
Finngrundet-Östra banken	SCI	SE0630260		No
Axmar-Gåsholma	SCI	SE0630166	13/01/2005	No
Eggegrund och Gråsjälsbådan	SCI	SE0630027	13/01/2005	No
Vitgrund-Norrskär	SCI	SE0630240	13/01/2005	No
Orarna	SCI	SE0630026	13/01/2005	No
Harkskärsfjärden	SCI	SE0630028	13/01/2005	No
Hölick	SCI	SE0630089	13/01/2005	No
Kuggörarna	SCI	SE0630094	13/01/2005	No
Testeboåns delta	SCI	SE0630165	13/01/2005	No
Vitörarna	SCI	SE0630170	13/01/2005	No
Gnarpskaten	SCI	SE0630171	13/01/2005	No
Sörsundet	SCI	SE0630178	13/01/2005	No
Limön	SCI	SE0630239	13/01/2005	No
Gnarps Masugn	SCI	SE0630172	13/01/2005	No
Billudden	SCI	SE0210212	13/01/2005	No
Gårdskärskusten	SCI	SE0210282	13/01/2005	No
Björns skärgård	SCI	SE0210280	13/01/2005	No
Hållnäskusten	SCI	SE0210019	13/01/2005	No
Bleckan	SCI	SE0210152		No
Slada	SCI	SE0210270	13/01/2005	No
Ängskär, Bondskäret	SCI	SE0210222	13/01/2005	No
Skaten-Rångsen	SCI	SE0210227	13/01/2005	No
Forsmarksbruk	SPA	SE0210153		No
Kallriga	SCI	SE0210220	13/01/2005	No
Örskär	SCI	SE0210228	13/01/2005	No
Västerbådan, Lågagrundet	SPA	SE0210040		No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve.
N/A	
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve.
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve.
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve.
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve. Part of the area is also closed for fisheries
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists. A nature reserve.
N/A	
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No Animal sanctuary
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	
N/A	
N/A	Fisheries management measures/restrictions: No Animal sanctuary
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	
N/A	Fisheries management measures/restrictions: No Animal sanctuary

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Hovön-Alnön	SCI	SE0210045	13/01/2005	No
Idön	SCI	SE0210256	13/01/2005	No
Långsandsörarna	SCI	SE0210286	13/01/2005	No
Ledskär	SCI	SE0210285	13/01/2005	No
Kapplasse	SCI	SE0210231	13/01/2005	No
Gräsö Gård	SCI	SE0210250	13/01/2005	No
Grillskäret	SCI	SE0210248	13/01/2005	No
Högbådan	SCI	SE0210249	13/01/2005	No
Öster-Mörtarö	SCI	SE0210313	13/01/2005	No
Eriksdal-Lönnholmen	SCI	SE0210251	13/01/2005	No
Sundsäng	SCI	SE0210264	13/01/2005	No
Rävsten	SCI	SE0210257	13/01/2005	No
Raggarön	SCI	SE0210326	13/01/2005	No
Själgrynnorna	Other			No
Sjöhagen	SCI	SE0210324	13/01/2005	No
Fagerön	SCI	SE0210052	13/01/2005	No
Hållet-Blåbådan	Other			No
Svenska Björn	SCI	SE0110124	13/01/2005	N/A
Svenska Högarna	SCI	SE0110096	13/01/2005	N/A
Stora Nassa	SCI	SE0110092	13/01/2005	N/A
Bullerö-Bytta	SCI	SE0110088	13/01/2005	N/A
Fjärdlång	SCI	SE0110086	13/01/2005	N/A
Huvudskär	SCI	SE0110111	13/01/2005	N/A
Utö	SCI	SE0110085	13/01/2005	N/A
Gunnarstenarna	SPA	SE0110083	13/01/2005	N/A
Askö	SCI	SE0220439	13/01/2005	Yes
Skärgårdsreservaten	SCI	SE0220129	13/01/2005	No
Stendörren	SCI	SE0220218	13/01/2005	No
Rågö	SCI	SE0220231	13/01/2005	No
Hävringe-Källskären	SCI	SE0220028	13/01/2005	No
Bokö-Oxnö	SCI	SE0220215	13/01/2005	No
Kråmö	SCI	SE0220509	13/01/2005	No
Tullgarn	SCI	SE0110003	13/01/2005	No
Marsviken	SCI	SE0220115	13/01/2005	No
Strandstuviken	SCI	SE0220020	13/01/2005	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	No
N/A	No
N/A	No
N/A	No
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	Fisheries management measures/restrictions: No Animal sanctuary
N/A	No
N/A	Fisheries management measures/restrictions: No A nature reserve, subject to management measures within that plan
N/A	Fisheries management measures/restrictions: No Animal sanctuary
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A Area was part of a pilot study looking for possible fisheries management measures inside Natura 2000 sites
N/A	
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
All	Fisheries management measures/restrictions: Yes A conservation and management plan for Natura 2000 area exists. Trawling is prohibited in parts o fthe area.
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	
N/A	Fisheries management measures/restrictions: N/A A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	
N/A	

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Fifång-Askö-Hartsö	Other			N/A
Bråviken yttre	SCI	SE0230090	13/01/2005	N/A
Gotska Sandön-Salvorev	SCI	SE0340097	13/01/2005	N/A
Sankt Anna och Gryts skärgårdar	SCI	SE0230055	13/01/2005	Yes
Åsvikelandet-Kvädö	SCI	SE0230138	13/01/2005	N/A
Stora Grindö	SCI	SE0330189	13/01/2005	N/A
Städsholmen	SCI	SE0330190	13/01/2005	N/A
Jutskär	SCI	SE0330187	13/01/2005	N/A
Sladö-Äskeskär	SCI	SE0330052	13/01/2005	N/A
Södra Malmö	SCI	SE0330253	13/01/2005	N/A
Örö Sankor	SCI	SE0330159	13/01/2005	N/A
Misterhult	SCI	SE0330049	13/01/2005	N/A
Stora Karlsö	SCI	SE0340023	13/01/2005	N/A
Lilla Karlsö	SCI	SE0340025	13/01/2005	N/A
Vållö	SCI	SE0330126	13/01/2005	N/A
Södviken	SCI	SE0330084	13/01/2005	N/A
Värnanäs skärgård	SCI	SE0330123	13/01/2005	N/A
Hoburgs bank	SCI	SE0340144	13/01/2005	N/A
Norra Midsjöbanken	SCI	SE0330273	01/07/2008	N/A
Torhamn-Hästholmen	SPA	SE0410041		N/A
Tromtö - Almö	SCI	SE0410042	01/12/2004	N/A
Pukaviksbukten	SCI	SE0410068	01/12/2004	N/A
Utklippan	SCI	SE0410040	01/12/2004	N/A
Falsterbo-Foteviken	SPA	SE0430002		No
Löddeåns mynning	SPA	SE0430091		No
Lundåkrabukten	SPA	SE0430138		No
Kullaberg	SCI	SE0430092	01/12/2004	No
Skälderviken	SPA	SE0430125		No
Tygelsjö-Gessie	SCI	SE0430149	01/12/2004	No
Vellinge ängar	SCI/SPA	SE0430150	01/12/2004	No
Falsterbohalvön	SCI/SPA	SE0430095	01/12/2004	No
Saxåns mynning-Järavallen	SCI	SE0430162	01/12/2004	No
Möllehässle-Kullen havsbad	SCI	SE0430082	01/12/2004	No
Skäldervikens östra klippkust	SCI	SE0430099	01/12/2004	No
Jonstorp-Vegeåns mynning	SCI	SE0430147	01/12/2004	No
Bjärekusten	SCI	SE0420232	01/12/2004	No
Hallands Väderö	SCI	SE0420002	01/12/2004	No
Lommabukten	SCI	SE0430148	01/12/2004	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	N/A
N/A	N/A
N/A	N/A
Marine	N/A
N/A	Fisheries management measures/restrictions: Yes Part of the area (Licknevarpefjärden) is closed for fisheries.
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	

Annex I. The management status of the Baltic Sea Natura 2000 sites and other marine protected areas

MPA (name)	**Type** (SCI/SPA/SAC/other)	**N2K code**	**Date confirmed as SCI, classified as SPA**	**Management plan** (yes/no)
Stenshuvud	SCI	SE0420134	01/12/2004	No
Sandhammaren-Kåseberga	SCI	SE0430093	01/12/2004	No
Ravlunda skjutfält	SCI	SE0420240	01/12/2004	No
Äspet	SCI	SE0420138	01/12/2004	No
Tostebergakusten	SCI	SE0420275	01/12/2004	No
Edenryd	SCI	SE0420274	01/12/2004	No
Rinkaby skjutfält	SCI	SE0420239	01/12/2004	No
Östra Hammaren-Käringören	SCI	SE0420276	01/12/2004	No
Stora Middelgrund och Röde bank	SCI	SE0510186	01/12/2009	N/A
Morups bank	SCI	SE0510187	01/12/2009	N/A
Lilla Middelgrund	SCI	SE0510126	01/12/2004	N/A
Fladen	SCI	SE0510127	01/12/2004	N/A
Balgö	SCI	SE0510050	01/12/2004	N/A
Nidingen	SCI	SE0510084	01/12/2004	N/A
Kungsbackafjorden	SCI	SE0510058	01/12/2004	N/A
Vrångöskärgården	SCI	SE0520001	01/12/2004	No
Nordre älvs estuarium	SCI	SE0520043	01/12/2004	No
Sälöfjorden	SCI	SE0520036	01/12/2004	No

Coverage (marine/ terrestrial/coastal/all)	**Fisheries management measures/restrictions and other remarks**
N/A	Fisheries management measures/restrictions: No A conservation plan for Natura 2000 area exists
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	N/A
N/A	N/A
N/A	Fisheries management measures/restrictions: N/A Area was part of a pilot study looking for possible fisheries management measures inside Natura 2000 sites
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	Fisheries management measures/restrictions: Yes A conservation plan for Natura 2000 area exists. Fishing is regulated under the Fisheries legislation (FIFS 2004:36) and for instance trawling is limited in this area.
N/A	
N/A	

Annex II. HABITATS AND COMMUNITIES OF THE BALTIC SEA AS IN MARINE EUNIS

The European habitat classification system EUNIS classifies habitats according to the characterising elements of the biotic environment (for instance dominant species) and a set of abiotic factors which are important drivers of community composition. The classes are arranged hierarchically, where the upper levels are mainly identified by abiotic factors (down to level 3) and the lower levels are described by a combination of biotic and abiotic descriptors.

The basis for the marine part of EUNIS is a classification of marine habitats of Britain and Ireland, developed by the British JNCC (Joint Nature Conservation Committee). The system has been extended to include also marine habitats of other European marine regions, including the Mediterranean and Baltic Seas, but some work remain before the Baltic habitats are fully integrated. The process of re-defining EUNIS habitat classes for the Baltic Sea is currently on-going by HELCOM Red List and EU SeaMap projects. This work should be ready 2013.

The current classification contains several shortcomings (eg. it does not consider energy or salinity). The first step to define EUNIS classes for the Baltic Sea was taken already in 2004. Baltic habitats were included in the EUNIS system by basically incorporating the habitats defined in the HELCOM Red List (HELCOM 1998). This resulted in a revised EUNIS system that allowed classification of Baltic marine habitats as far as level 3, but the finer levels were still mostly poorly developed.

The HELCOM Red List of Biotopes was directly transferred to EUNIS without any considerable changes. The habitats are systematically discriminated by depth zones (hydrolittoral, infralittoral and sublittoral) and sediment (rock, stony, gravel, sandy, muddy, mixed and shell gravel). Geomorphological features of the seabed (banks, bars, level bottoms), physiographic features (narrow inlets), biological features for habitats (presence/absence of vegetation, reefs, taxonomic groups (e.g. angiosperms), associations), salinity (brackish, reduced or varying salinity) and exposure (exposed, moderately exposed and sheltered) appear across individual habitats sporadically. (HELCOM 1998)

This Annex lists the marine EUNIS habitats and communities found from the Baltic Sea. Proposals for more detailed definitions of the habitat types is provided based on the evidence collected during Oceana's expedition in April-May 2011.

- A2: Littoral sediment
  - A2.8: Features of littoral sediment
    - A2.83: Hydrolittoral stony substrata
      - A2.831: Hydrolittoral stony substrata: level bottoms with little or no macrophyte vegetation
      - A2.832: Hydrolittoral stony substrata: level bottoms dominated by macrophyte vegetation
      - A2.833: Hydrolittoral stony substrata: reefs
    - A2.84: Hydrolittoral gravel substrata
      - A2.841: Hydrolittoral gravel substrata: level bottoms with little or no macrophyte vegetation
      - A2.842: Hydrolittoral gravel substrata: level bottoms dominated by macrophyte vegetation
      - A2.843: Hydrolittoral gravel substrata: banks
    - A2.85: Hydrolittoral sandy substrata
      - A2.851: Hydrolittoral sandy substrata: level bottoms with little or no macrophyte vegetation
      - A2.852: Hydrolittoral sandy substrata: level bottoms dominated by macrophyte vegetation
      - A2.853: Hydrolittoral sandy substrata: bars
      - A2.854: Hydrolittoral sandy substrata: banks
    - A2.86: Hydrolittoral muddy substrata
      - A2.861: Hydrolittoral muddy substrata: with little or no macrophyte vegetation
      - A2.862: Hydrolittoral muddy substrata: dominated by macrophyte vegetation
    - A2.87: Hydrolittoral mixed sediment substrata
      - A2.871: Hydrolittoral mixed sediment substrata: with little or no macrophyte vegetation
      - A2.872: Hydrolittoral mixed sediment substrata: dominated by macrophyte vegetation

A2.83: sub-levels includes no descriptions in EUNIS; these comes from HELCOM (1998) classification. These are equivalent to A2.511, A2.512 and A2.513.

A2.84: sub-levels includes no descriptions in EUNIS; these comes from HELCOM (1998) classification. These are equivalent to A2.521, A2.522 and A2.523.

A2.85: sub-levels includes no descriptions in EUNIS; these comes from HELCOM (1998) classification. These are equivalent to A2.531, A2.532, A2.533 and A2.534.

A2.86: sub-levels includes no descriptions in EUNIS; these comes from HELCOM (1998) classification. These are equivalent to A2.541 and A2.542

A2.87: sub-levels includes no descriptions in EUNIS; these comes from HELCOM (1998) classification. These are equivalent to A2.551 and A2.552

A3: Infralittoral rock and other hard substrata

A3.4: Baltic exposed infralittoral rock

A3.5: Baltic moderately exposed infralittoral rock

A3.6: Baltic sheltered infralittoral rock

A3.7: Features of infralittoral rock

Infralittoral rock includes habitats of bedrock, boulders and cobbles which occur in the shallow subtidal zone and typically support seaweed communities. Based on the EUNIS description, the upper limit is marked by the top of the kelp zone whilst the lower limit is marked by the lower limit of kelp growth or the lower limit of dense seaweed growth. In Kattegat we found infralittoral rocks to be mainly dominated by kelps (*Laminaria* sp.) and seaweeds (like *Delesseria sanguinea*).

In the northern parts of the Baltic Sea, particularly in the Bothnian Sea the infralittoral zone is often inhabited by water moss (*Fontinalis* sp.), sometimes mixed with pondweeds (*Potamogeton* sp.). Also Baltic sublittoral reefs falls into this category.

A4: Circalittoral rock and other hard substrata

A4.4: Baltic exposed circalittoral rock

A4.5: Baltic moderately exposed circalittoral rock

A4.6: Baltic sheltered circalittoral rock

A4.7: Features of circalittoral rock

Based on the EUNIS description circalittoral rock is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The circalittoral zone can itself be split into two sub-zones; upper circalittoral (foliose red algae present but not dominant) and lower circalittoral (foliose red algae absent). The character of the fauna varies enormously and is affected mainly by wave action, tidal stream strength, salinity, turbidity, the degree of scouring and rock topography. By the description it is typical for the community not to be dominated by single species, as is common in shore and infralittoral habitats, but rather comprise a mosaic of species.

In the Baltic Sea (excluding Kattegat), Blue mussels (*Mytilus* sp.) are the major habitat forming community in the circalittoral rock which are not exposed to ice scouring.

Oceana proposes to amend the description of this habitat type to include also *Alcyonium digitatum* dominated communities in circalittoral rock. In Kattegat and the Sound we found *Alcyonium digitatum* dominating the rocks and boulders in many places. Sea urchins (*Spatangus purpureus* and *Psammechinus miliaris*) are very abundant as well as brittle stars (*Ophiura robusta*, *Ophiocomina nigra*, *Ophiura ophiura*). Likewise, sea anemone Metridium senile and a number of hydroids are common. Macrophytes, like big kelps (Laminaria saccharina) as well as red algae (Delesseria sanguinea) are also common on shallower areas, in deeper waters those are absent. This correspond to OSPAR habitat "coral gardens".

A5: Sublittoral sediment

A5.1: Sublittoral coarse sediment

A5.11: Infralittoral coarse sediment in low or reduced salinity

A5.111: Baltic level gravel bottoms of the infralittoral photic zone with little or no macrophyte vegetation
A5.112: Baltic gravel banks of the infralittoral photic zone
A5.113: Baltic shell gravel bottoms in the infralittoral photic zone
A5.114: Baltic gravel bottoms of the aphotic zone
A5.115: Baltic shell gravel bottoms of the aphotic zone

A5.2: Sublittoral sand

A5.21: Sublittoral sand in low or reduced salinity

A5.211: Baltic level sandy bottoms of the infralittoral photic zone with little or no macrophyte vegetation

A5.212: Baltic sand bars of the infralittoral photic zone

A5.213: Baltic sand banks of the infralittoral photic zone

A5.214: [Macoma balthica] in brackish environment (seasonally ice-covered)

A5.27: Deep circalittoral sand

A5.273: Baltic sandy bottoms of the aphotic zone

Based on our recordings the Baltic isopod, *Saduria entomon,* was the major species found from these habitats in the Bothnian Bay.

A5.3: Sublittoral mud

A5.31: Sublittoral mud in low or reduced salinity

A5.311: Baltic brackish water sublittoral muddy biocenoses influenced by varying salinity

A5.3111: Baltic muds of the infralittoral photic zone with little or no macrophyte vegetation

A5.3112: Boreal Baltic narrow inlets with soft mud substrate

The EUNIS description of this habitat type includes characteristic species for this community polychaet (*Arenicola marina*), mysids (*Carcinus maenas, Corophium volutator*) etc.

Oceana proposes to amend this habitat type to include also the *Haploops* and *Modiolus* communities in Kattegat and the Sound. Also the *Macoma baltica* communities of the Baltic Proper should be included, though large areas of the subhalocline areas in the Baltic Proper and in parts of the Belt Sea are without macrofauna. Similarly the *Monoporeia affinis* common in the northern Baltic Sea should be added to the description. In shallow, low-salinity areas we also recorded freshwater species and insect larvae (like dragonfly larvae), which are also typical to this type of habitat in the northern Baltic Sea.

A5.35: Circalittoral sandy mud

A5.351: [Amphiura filiformis], [Mysella bidentata] and [Abra nitida] in circalittoral sandy mud

A5.353: [Amphiura filiformis] and [Nuculoma tenuis] in circalittoral and offshore muddy sand

A5.354: [Virgularia mirabilis] and [Ophiura] spp. with [Pecten maximus] on circalittoral sandy or shelly mud

A5.3541: [Virgularia mirabilis] and [Ophiura] spp. with [Pecten maximus], hydroids and ascidians on circalittoral sandy or shelly mud with shells or stones

Based on the Oceana's observation this habitat type can also be dominated by Phosphorescent sea pen (*Pennatula phosporea*) in Kattegat soft sediment bottoms, consisting mainly of mud, but also seen on mixed sand and mud bottom. Other species occurring in the same area include echinoderms (*Marthasterias glacialis*, *Amphiura chiajei*, *Ophiocomina nigra* and *Brissophis lyrifera*), crustaceans (such as *Pagurus bernhardus*) and several fish species (*Myxine glutinosa*, *Reinhardtius hippoglossoides*, and *Trisopterus esmarki*). Sometimes both *Virgularia mirabilis* and *P. phosphorea* were observed at the same areas.

A5.36: Circalittoral fine mud

A5.361: Seapens and burrowing megafauna in circalittoral fine mud

In Kattegat Oceana found this habitat to be dominated both *Pennatula phosporea* and *Virgularia mirabillis* in soft sediment bottom, consisting mainly of mud, but also seen on mixed sand and mud bottom. Other species found include echinoderms (*Ophiura* spp., *Asterias rubens*, *Strongylocentrotus droebachiensis*, and *Brissopsis lyrifera*), crustaceans (*Pagurus bernhardus*, *Liocarcinus depurator*, and *Munida rugosa*), molluscs (*Aporrhais pespelecani*, *Buccinum undatum*, and *Pecten maximus*), and many species of fish (*Gadus morhua*, *Limanda limanda*, *Callionymus lyra*, *Myxine glutinosa*, *Pleuronectes platessa*, and *Pomatoschistus minutus*).

A5.363: [Brissopsis lyrifera] and [Amphiura chiajei] in circalittoral mud

A5.37: Deep circalittoral mud

A5.378: Baltic muddy bottoms of the aphotic zone

The EUNIS description for this habitat type include mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50-70 m, a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as [Thyasira] spp., echinoderms and foraminifera.

Oceana proposes to amend the description of this habitat type to include also *Alcyonium digitatum* dominated communities. This is the second type of *Alcyonium digitatum* dominated community that was documented by Oceana from the deeps in the central Kattegat. The sediments consist of mud with rocks and boulders on which the Alcyonium digitatum was attached. As comparison for the community in the shallower waters, this area is characterized with Echinoderm communities (particularly Brissopsis lyrifera and Echinus esculentus). Modiolus community as well as burrowing worms (Arenicola marina) are also abundant between the rocks. Crustaceans were also more common than in the shallower areas. This correspond to OSPAR habitat “coral gardens”.

- A5.4: Sublittoral mixed sediment
  - A5.41: Sublittoral mixed sediment in low or reduced salinity
    - A5.411: Baltic level mixed sediment bottoms of the infralittoral photic zone with little or no macrophyte vegetation
    - A5.412: Baltic mixed sediment bottoms of the aphotic zone
  - A5.44: Circalittoral mixed sediments
    - A5.445: [Ophiothrix fragilis] and/or [Ophiocomina nigra] brittlestar beds on sublittoral mixed sediment

We recorded in the depths of 110-135 *Suberites virgultosus* dominated communities in Kattegat. At places the community consisted of *S. virgultosus* mixed with other sponges. In other places brittle stars, like *Acrocnida brachiata*, and worms, like *Arenicola marina*, are very abundant. This type of habitat description should be added under A5.4. This habitat type could also fit to A5.37 (A5.378).

- A5.5: Sublittoral macrophyte-dominated sediment
  - A5.51: Maerls beds
  - A5.52: Kelp and seaweed communities on sublittoral sediment
    - A5.521: [Laminaria saccharina] and red seaweeds on infralittoral sediments
    - A5.522: [Laminaria saccharina] and [Chorda filum] on sheltered upper infralittoral muddy sediment
    - A5.523: [Laminaria saccharina] with [Psammechinus miliaris] and/or [Modiolus modiolus] on variable salinity infralittoral sediment
    - A5.524: [Laminaria saccharina], [Gracilaria gracilis] and brown seaweeds on full salinity infralittoral sediment
    - A5.525: [Laminaria saccharina] and [Gracilaria gracilis] with sponges and ascidians on variable salinity infralittoral sediment
  - A5.54: Angiosperm communities in reduced salinity
    - A5.541: Vegetation of brackish waters dominated by [Phragmites australis]
    - A5.542: Association with [Potamogeton pectinatus]
    - A5.543: Vegetation of brackish waters dominated by [Ranunculus baudotii]
    - A5.544: Vegetation of brackish waters dominated by [Scirpus lacustris] or [Scirpus tabernaemontani]
    - A5.545: [Zostera] beds in reduced salinity infralittoral sediments
- A5.6: Sublittoral biogenic reefs
  - A5.62: Sublittoral mussel beds on sediment
    - A5.627: Baltic mussel beds in the infralittoral photic zone
      - A5.6271: Baltic mussel beds in the infralittoral photic zone with little or no macrophyte vegetation
      - A5.6272: Baltic mussel beds of the infralittoral photic zone dominated by macrophyte vegetation
- A5.7: Features of sublittoral sediments
  - A5.71: Seeps and vents in sublittoral sediments
    - A5.711: Bubbling reefs in the sublittoral euphotic zone
      - A5.7111: Bubbling reefs in the sublittoral euphotic zone with little or no macrophyte vegetation
      - A5.7112: Bubbling reefs in the sublittoral euphotic zone dominated by macrophyte vegetation
    - A5.712: Bubbling reefs in the aphotic zone
  - A5.72: Organically-enriched or anoxic sublittoral habitats
    - A5.721: Periodically and permanently anoxic sublittoral muds
      - A5.7211: [Beggiatoa] spp. on anoxic sublittoral mud

Annex III. List of all species recorded during the expedition. Total number of species is 301.

Porifera		
Clathria sp.	*Halichondria panicea*	*Iophonopsis nigricans*
Demospongiae	*Haliclona urceolus*	*Raspailia hispida*
Ephydatia fluviatilis	*Haliclona limbata*	*Suberites luetkeni*
Cnidaria		
Abietinaria abietina	*Halecium halecinum*	*Sagartia troglodytes*
Alcyonium digitatum	*Hydractinia echinata*	*Sagartiogeton laceratus*
Aurelia aurita	*Kirchenpaueria pinnata*	*Sagartiogeton undatus*
Bougainvillia ramosa	*Laomedea flexuosa*	*Sertularella* sp.
Caryophyllia smithii	*Laomedea loveni*	*Sertularia cupressina*
Cerianthus lloydii	*Laomedea* sp.	*Stomphia coccinea*
Clava multicornis	*Metridium senile*	*Tubularia indivisa*
Cordylophora caspia	*Nemertesia ramosa*	*Tubularia larynx*
Corymorpha nutans	*Obelia geniculata*	*Tubularia* sp.
Cyanea lamarckii	*Pachycerianthus multiplicatus*	*Urticina eques*
Eudendrium rameum	*Pennatula phosphorea*	*Urticina felina*
Eudendrium sp.	*Rhizocaulus verticillatus*	*Virgularia mirabilis*
Ctenophora		
Beroe cucumis	*Bolinopsis infundibulum*	*Pleurobrachia pileus*
Echinodermata		
Acrocnida brachiata	*Echinocardium cordatum*	*Ophiocomina nigra*
Amphiura cf. *chiajei*	*Henricia sanguinolenta*	*Psammechinus millaris*
Amphiura filiformis	*Luidia sarsi*	*Psolus phantapus*
Amphiura sp.	*Marthasterias glacialis*	*Solaster endeca*
Asterias rubens	*Ophiopholis aculeate*	*Spatangus purpureus*
Astropecten irregularis	*Ophiothrix fragilis*	*Strongylocentrotus droebachiensis*
Brissopsis lyrifera	*Ophiura albida*	*Thyone* cf. *fuscus*
Crossaster papposus	*Ophiura ophiura*	
Echinus esculentus	*Ophiura robusta*	
Crustacea		
Balanus balanus	*Hyas araneus*	*Mysis relicta*
Balanus crenatus	*Hippolite varians*	*Neomysis integer*
Balanus improvisus	*Idotea baltica*	*Pagurus bernhardus*
Balanus sp.	*Inachus* sp.	*Palaemon adspersus*
Cancer pagurus	*Jaera albifrons*	*Palaemonetes varians*
Caprella linearis	*Jassa falcata*	*Pallasea quadrispinosa*
Carcinus maenas	*Liocarcinus depurator*	*Pandalus borealis*
Crangon crangon	*Lithodes maja*	*Pontoporeia femorata*
Diastylis rathkei	*Meganyctiphanes norwegica*	*Saduria entomon*
Gammarus sp.	*Monoporeia affinis*	
Haploops cf. *tenuis*	*Munida rugosa*	

Annex III. List of all species recorded during the expedition. Total number of species is 301.

	Mollusca	
Acanthodoris pilosa	*Epitonium clathrus*	*Oenopota turricula*
Acanthordia echinata pilosa	*Epitonium* sp.	*Parvicardium exiguum*
Aeolidia cf. *papillosa*	*Gibbula cineraria*	*Parvicardium* sp.
Aequipecten opercularis	*Hiatella arctica*	*Pecten maximus*
Antalis entalis	*Hydrobia* sp.	*Polinices catena*
Aporrhais pespelecani	*Leptochiton asellus*	*Polinices pallidus*
Astarte montagui	*Leptochiton* sp.	*Propebela turricula*
Astarte sp.	*Lepidochitona cinerea*	*Pseudamussium peslutrae*
Bittium reticulatum	*Littorina littorea*	*Pseudamussium septemradiatus*
Buccinum undatum	*Lucinoma borealis*	*Radix peregra*
Cerastoderma lamarcki	*Macoma balthica*	*Rissoa* sp.
Cerastoderma sp.	*Modiolus modiolus*	*Spisula* sp.
Coryphella verrucosa	*Mytilus edulis*	*Theodoxus fluviatilis*
Cuthona nana	*Mytilus trossulus*	*Thyasira flexuosa*
Dendronotus frondosus	*Mytilus* sp.	*Tonicella marmorea*
Emarginula crassa	*Neptunea antiqua*	*Tonicella rubra*
Ensis americanus	*Nucula nucleus*	*Turritella communis*
Ensis arcuatus	*Nucula* sp.	
Ensis ensis	*Nuculana pernula*	

	Brachiopoda	
Neocrania anomala		

	Chaetognatha	
Sagitta sp.		

	Bryozoa	
Alcyonidium mytili	*Crisia* sp.	*Flustra foliacea*
Caberea ellisii	*Electra crustulenta*	*Membranipora membranacea*
Crisia eburnea	*Electra pilosa*	*Reteporella beaniana*

	Annelida	
Amphitrite cirrata	*Neoamphitrite figulus*	*Pygospio elegans*
Anobothrus sp.	*Phascolion strombus*	*Sabella penicillus*
Arenicola marina	*Phyllodoce maculata*	*Sipunculus* sp.
Filograna implexa	*Piscicola goemetra*	*Spirorbis spirorbis*
Harmothoe sp.	*Polydora ciliata*	*Spirorbis* sp.
Lanice conchilega	*Polyphysia crassa*	*Terebellides stroemii*
Myxicola cf. *infundibulum*	*Pomatoceros triqueter*	

	Platyhelminthes	
Dendrocoelum lacteum	*Leptoplana alcinoi*	

	Foraminifera	
Hyalinea balthica		

OCEANA

Annex III. List of all species recorded during the expedition. Total number of species is 301.

Insecta		
Phryganea bipunctata		
Chordata: Tunicata		
Ascidiacea	*Botryllus schlosseri*	*Molgula cf. manhattensis*
Ascidia virginea	*Ciona intestinalis*	
Ascidiella aspersa	*Corella parallelogramma*	
Ascidiella scabra	*Dendrodoa grossularia*	
Chordata: Agnatha		
Myxine glutinosa		
Chordata: Fish (Osteichthyes)		
Agonus cataphratus	*Liparis fabricii*	*Pomatoschistus minutus*
Ammodytes tobianus	*Liparis liparis*	*Psetta maxima*
Amblyraja radiata	*Lumpenus lampretiformis*	*Pungitius pungitius*
Anguilla anguilla	*Lycodes vahli*	*Reinhardtius hippoglossoides*
Callionymus lyra	*Melanogrammus aeglefinus*	*Rhinonemus cimbrius*
Centrolabrus exoletus	*Merlangius merlangus*	*Scophthalmus rhombus*
Ctenolabrus rupestris	*Micromesistius poutassou*	*Solea solea*
Cyclopterus lumpus	*Microstomus kitt*	*Spinachia spinachia*
Entelurus aequoreus	*Molva molva*	*Syngnathus abaster*
Enchelyopus	*Myoxocephalus quadricornis*	*Syngnathus acus*
Gadus morhua	*Myoxocephalus scorpius*	*Syngnathus typhle*
Gasterosteidae	*Nerophis ophidion*	*Taurulus bubalis*
Gasterosteus aculeatus	*Pholis gunnellus*	*Trachinus draco*
Gobiidae	*Platichthys flesus*	*Trisopterus esmarkii*
Gobiusculus flavescens	*Pleuronectes platessa*	*Zeugopterus regius*
Hippoglossoides platessoides	*Pollachius* cf. *pollachius*	*Zoarces viviparus*
Lesueurigobius friesii	*Pomastoschistus norvegicus*	
Limanda limanda	*Pomatoschistus microps*	
Chordata: Mammalia		
Halichoerus grypus	*Phoca vitulina*	
Magnoliophyta		
Potamogeton perfoliatus	*Ruppia* sp.	*Zostera marina*
Rhodophyta		
Ceramium sp.	*Furcellaria lumbricalis*	*Phimatolithon lenormandii*
Coccotylus truncatus	*Halarachnion ligulatum*	*Phyllopora pseudoceranoides*
Corallina officinalis	*Hildenbrandia rubra*	*Phymatolithon lenormandii*
Dasya bailouviana	*Lithothamnion glaciale*	*Phymatolithon* sp.
Delesseria sanguinea	*Membranoptera alata*	*Polyides rotundus*
Dilsea carnosa	*Odonthalia dentata*	*Polysiphonia fucoides*
Dumontia contorta	*Palmaria palmata*	*Rhodophyllus* cf. *divaricata*

Annex III. List of all species recorded during the expedition. Total number of species is 301.

Phaeophyta		
Ascophyllum nodosum	*Fucus* sp.	*Laminiaria saccharina*
Fucus serratus	*Halidrys siliquosa*	*Pelvetia canaliculata*
Fucus spiralis	*Halosiphon tomentosa*	*Pilayella littoralis*
Fucus vesiculosus	*Laminaria digitata*	*Sphacelaria arctica*
Chlorophyta		
Chaetomorpha melagonium	*Enteromorpha prolifera*	*Monostroma grevillei*
Chaetomorpha sp.	*Halosiphon tomentosus*	
Bryophytes		
Fontinalis antipyretica		
Hydrophythes		
Myriophyllum sp.		

References

Detail of the fin of a shorthorn sculpin (*Myoxocephalus scorpius*) with leech (*Piscicola geometra*), western Gotland Basin, Sweden. © OCEANA/ Carlos Minguell

- Anger, K., Rogal U., Schriever G. & Valentin C. 1977. In-situ investigation on the echinoderm Asterias rubens as a predator of soft-bottom communities in the western Baltic Sea. Helgoland Marine Research, Vol. 29, 4: 439-459.
- Anon. 1979. Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive). Official Journal of the European Union, L 103, 25.04.1979.
- Anon. 1992. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). Official Journal of the European Union, L 206, 22.7.1992.
- Anon. 2008. Directive 2008/56/EC of the European Parliament and the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive). Official Journal of the European Union, L 164/19, 25.06.2008.
- Anon. 2010. Consolidated version of the treaty on the functioning of the European Union. Official Journal of the European Union C 83/47, 30.3.2010.
- Appelgren, K. & Mattila, J. 2005. Variation in vegetation communities in shallow bays of the northern Baltic Sea, Aquat. Bot. 83: 1-13.
- Bäck S, Kautsky H, Kruk-Dowgiallo L, Jurgilaite D 2002. Phytobenthos. In HELCOM 2002: Environment of the Baltic Sea 1994-1998. Baltic Sea Environment Proceedings 82b, Helsinki Commission: 164-165:215.
- Berglund, B. E., Sandgren, P., Barnekow, L., Hannon, G., Jiang, H., Skog, G., Yu, S.-Y. 2005. Early - Holocene history of the Baltic Sea, as reflected in coastal sediments in Blekinge, southeastern Sweden. Quarternary International 130: 111-139.
- Bergström & Bergström 1999. Species diversity and distribution of aquatic marcophytes in the Northern Quark, Baltic Sea. Nordic Journal of Botany 19, 3: 375-383.
- Bonsdorff, E. 2006. Zoobenthic diversity-gradients in the Baltic Sea: Continuous post-glacial succession in a stressed ecosystem. Journal of Experimental Marine Biology and Ecology 330: 283-391.
- Bonsdorff, E., Laine, A. O, Hänninen J., Vuorinen I. & Norkko A. 2003. Zoobenthos of the outer archipelago waters (N. Baltic Sea) - the importance of local conditions for spatial distribution patterns. Boreal Environment Research, 8: 135-145.
- Boström, C., Bonsdorff, E., Kangas, P. & Norkko, A. 2002. Long-term changes in a brackish water Zostera marina community indicate effects of eutrophication. Estuarine Coastal Shelf Science 55: 795-804.
- Boström, C., Baden, S. & Krause-Jensen, D. 2003. The seagrasses of Scandinavia and the Baltic Sea. Julk.: Green, E. P., Short, F. T. & Spalding, M. D. (eds.) World Atlas of Seagrasses: Present Status and Future Conservation. California Press, Berkley, pp. 27-37.
- Boström, C., Roos, C. & Rönnberg, O. 2004. Shoot morphometry and production dynamics of two eelgrass (Zostera marina L.) populations at the lower salinity limit: a field study from the northern Baltic Sea (61° N). Aquatic Botany 79: 145-161.
- Bothnian Bay LIFE project (2001-2005) Availbale at: http://wwwp.ymparisto.fi/perameri/welcome.htm [Viewed: 13 October 2011]
- Bucas, M., Daunys, D. & Olenin, S. 2007. Overgrowth patterns of the red algae *Furcellaria lumbricalis* at an exposed Baltic Sea coast: The results of a remote underwater video data analysis. Estuarine, Coastal and Shelf Science 75, 308-316.
- Callaway, R. 2006. Tube worms promote community change. Mar Ecol Prog Ser, 308: 49-60.
- Cardinale, M. & Svedäng, H. 2011. The beauty of simplicity in science: Baltic cod stock improves rapidly in a 'cod hostile' ecosystem state. Marine Ecology Progress Series, Vol. 425: 297-301.
- CBD (Convention on Biological Diversity) 2004. 7th Conference of the Parties. Decision VII/5 on Marine and coastal biological diversity. Available at: http://www.cbd.int/decision/cop/?id=7742 [Viewed: 13 October 2011]
- DHI 2008. Havvindmøller ved Sprogø. Sund og Bælt Rapport.
- Donner K. O., Lindström A. and Lindström M (1987) Seasonal variation in the vertical migration of *Pontoporeia affinis* (Crustacea, Amphipoda). Ann. Zool. Fennica 24: 305-313.
- Ejdung, C. & Bonsdorff, E. 1992. Predation on the bivalve *Macoma balthica* by the isopod *Saduria entomon*: laboratory and field experiments. Marine Ecology Progress Series. Vol. 88: 207-214.
- European Commission 2007. Interpretation manual of European Union habitats. Interpretation Manual - EUR27. 144 pp.
- European Commission 2011. Our life insurance, our natural capital: an EU biodiversity strategy to 2020. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions. COM(2011) 244 final.
- Frenzilli, G., Scarcelli, V., Barga, I. D., Nigro, M., Förlin, L., Bolognesi, C. & Sturve, J. 2004. DNA damage in eelpout (*Zoarces viviparus*) from Göteborg harbour. Mutation Research, 552: 187-195.
- Gell, F. R., Roberts, C. M. 2003. Benefits beyond boundaries: the fishery effects of marine reserves and fishery closures. Trends in Ecology and Evolution 18: 448-455.

- Goecker, M. E. and Kåll, S. E. 2003. Grazing preferences of marine isopods and amphipods on three prominent algal species of the Baltic Sea. Journal of Sea Research, 50: 309-314.
- Goldberg, C. & Nejrup, L. 2010. Velegnede lokaliteter for marine nationalparker. Danmarks Naturfredningsforening, 22 pp.
- Göransson, P., Bertilson Vuksa, S., Karlteft, J. & Börjesson, L. 2010. *Haploops*-samhället och *Modiolus*-samhället utanför Helsingborg 2000-2009. Miljönämnden i Helsingborg. 79 pp.
- Greenpeace 2004. Rescuing the North and Baltic Seas: Marine Reserves - a key tool. 40 pp.
- Haapala J. 1994. Upwelling and its Influence on Nutrient Concentration in the Coastal Area of the Hanko Peninsula, Entrance of the Gulf of Finland. Estuarine, Coastal and Shelf Science 38, pp. 507-521.
- Halpern, B. S. 2003. The impact of marine reserves: Do reserves work and does reserve size matter? Ecological Applications, 13, 1: 117-137.
- HELCOM 1994. HELCOM Recommendation 15/5 on the System of coastal and marine Baltic Sea Protected Areas (BSPA). Available at: http://www.helcom.fi/Recommendations/en_GB/rec15_5/ [Viewed: 13 October 2011]
- HELCOM 1998. Red List of Marine and Coastal Biotopes and Biotope Complexes of the Baltic Sea, Belt Sea and Kattegat - Including a comprehensive description and classifi cation system for all Baltic Marine and Coastal Biotopes. Baltic Sea Environment Proceedings No. 75. Helsinki Commission, Helsinki. 115 pp. Available at: http://www.helcom.fi/publications/bsep/en_GB/bseplist/ [Viewed: 13 October 2011]
- HELCOM 2003. HELCOM Bremen Declaration. Adopted 23 June 2003.
- HELCOM 2007a. HELCOM Baltic Sea Action Plan. Helsinki Commission, Helsinki. 103 pp. Available at: http://www.helcom.fi /BSAP/ActionPlan/en_GB/ActionPlan [Viewed: 13 October 2011]
- HELCOM 2007b. HELCOM lists of threatened and/or declining species and biotopes/habitats in the Baltic Sea area. Baltic Sea Environmental Proceedings No. 113. Helsinki Commission, Helsinki. 18 pp. Available at: http://www.helcom.fi /publications/ bsep/en_GB/bseplist/ [Viewed: 13 October 2011]
- HELCOM 2009a: Eutrophication in the Baltic Sea - An integrated thematic assessment of the effects of nutrient enrichment in the Baltic Sea region. Baltic Sea Environment Proceedings 115B. Available at: http://meeting.helcom.fi/c/document_library/get_file?p_l_id=79889&folderId=377779&name=DLFE-36818.pdf [Viewed: 13 October 2011]
- HELCOM 2009b. Biodiversity in the Baltic Sea - An integrated thematic assessment on biodiversity and nature conservation in the Baltic Sea. Baltic Sea Environment Proceedings No. 116B. Available at: http://www.helcom.fi/stc/files/Publications/Proceedings/bsep116B.pdf [Viewed: 13 October 2011]
- HELCOM 2010a. Ecosystem Health of the Baltic Sea 2003-2007: HELCOM Initial Holistic Assessment. Baltic Sea Environment Proceedings No. 122. Available at: http://www.helcom.fi/stc/files/Publications/Proceedings/bsep122.pdf [Viewed: 13 October 2011]
- HELCOM 2010b. Towards an ecologically coherent network of well-managed Marine Protected Areas - Implementation report on the status and ecological coherence of the HELCOM BSPA network. Baltic Sea Environment Proceedings No. 124B. Available at: http://www.helcom.fi/stc/files/Publications/Proceedings/bsep124B.pdf [Viewed: 13 October 2011]
- Herkul, K., Kotta, J. & Pärnoja, M. 2011. Effect of physical disturbance on the soft sediment benthic macrophyte and invertebrate community in the northern Baltic Sea. Boreal Environment Research, 16 (suppl. A): 209-219.
- Hjernquist, M. Gotlands Ornitologiska Förening 2009. Synspunkter på Nord Streams gasledningsprojekt i Östersjön. Dnr nr 121-7846-06.
- Hughes, J. 1998. Sea pens and burrowing megafauna. An overview of dynamics and sensitivity characteristics for conservation management of marine SACs. Prepared for Scottish Association for Marine Science (SAMS), UK Marine SACs Project, Task Manager A.M.W. Wilson, SAMS. 114 pp.
- Hällfors, G., Leskinen, E., Niemi, A. 1983. Hydrography, chlorophyll and nutrients at Tvärminne Storfjärd, Gulf of Finland, in 1979/80. Sci. Reps. Walter and Andree de Nottbeck Foundation, Helsinki 4: 1-19.
- Jones, P. J. S. 2002. Marine protected area strategies: issues, divergences and the search for middle ground. Reviews in Fish Biology and Fisheries 11: 197-216.
- Jones, P. J. S., Qiu W. & De Santo E. M. 2011. Governing Marine Protected Areas - Getting the Balance Right. Technical Report, United Nations Environment Programme. 126 pp.
- Kautsky, L. & Kautsky, H. 1989. Algal diversity and dominance along gradients of stress and disturbance in marine environments. Vegetation 83: 259-267.
- Kautsky, L. & Kautsky, N. 2000. Baltic Sea, including Bothnian Sea and Bothnian Bay. In: Sheppard, C.R.C (ed) Seas at the millenium: an environmental evaluation. Elsevier Science Ltd. Chapter 8. 1-14.
- Kautsky, L., Kautsky, H., Kautsky, U. & Waern, M. 1986. Decreased depth penetration of *Fucus vesiculosus* (L.) since the 1940's indicates eutrophication of the Baltic Sea. Marine Ecology - Progress Series, 28: 1-8.
- Køie, M. & Kristiansen, A. 2000. Havets dyr og planter. Gads Forlag. 351 pp.

- Koponen, T., Karttunen, K. & Piippo, S. 1995. Suomen vesisammalkasvio (Aquatic bryophytes of Finland). Bryobrothera 3: 1-86.
- Krog, C. 1999. Vrag og revfiskeri i Kattegat i Kortlægning af stenrev, stenfiskeri og fiskeri på hårdbund samt metoder til videnskabelige undersøgelser af rev og hårdbund. Josianne Støttrup (Ed.). Danmarks Fiskeriundersøgelser. DFU-Rapport nr. 63-99.
- Lassig, J. 1965. Notes on the invertebrate fauna of the northern Baltic area. Commentationes Biologicae, Societas Scientiarum Fennica, Vol 28, No. 8: 1-6.
- Liman, A-S., Andersson, Å. & Huggins, A. 2008. Towards a Representative Network of Marine Protected Areas in the Baltic Sea. Balance Interim Report No 24. 72 pp.
- Matthews, J. B. L., Buchholz, F., Saborowski, R., Tarling, G. A., Dallott, S. & Labat, J. P. 1999. On the physical oceanography of the Kattegat and Clyde Sea area, 1996-98, as background to ecophysiological studies on the planktonic crustacean, Meganyctiphanes norvegica (Euphausiacea). Helgol Mar Res 53: 70-84.
- Merkouriadi M. & Leppäranta M. L. 2010. Heat budget during the ice season in Hanko Peninsula, Finland. Poster at International Polar Year, Olso Science Conference, 8-12 June 2010. Available at: http://ipy-osc.no/abstract/385069 [Viewed: 13 October 2011]
- Moen, F. E. & Svensen, E 2008. Djurliv i havet. Nordeuropeisk marin fauna. Norstedts.
- Möllmann, C., Diekmann, R., Müller-Karulis, B. *et al.* 2009. Reorganization of a large marine ecosystem due to atmospheric and anthropogenic pressure: a discontinuous regime shift in the Central Baltic Sea. Global Change Biology. 15:1377-1393.
- Naturstyrelsen, Denmark. Available at: http://www.naturstyrelsen.dk/Naturbeskyttelse/Natura2000/Natura_2000_planer/Planforslag/126_246/Oversigt_246.htm [Viewed: 13 October 2011]
- Naturvårdsverket N. 2000, Sweden. Available at: http://w3.vic-metria.nu/n2k/jsp/show-start-page.do [Viewed: 13 October 2011]
- Naturvårdsverket 2006. Inventering av marina naturtyper på utsjöbankar. Rapport 5576.
- Naylor, P. 2011. Great British Marine Animals, 3rd edition. Sound diving publications.
- Nielsen, R., Kristiansen, A., Mathiesen, L., Mathiesen, H. 1995. Distribution index of the benthic macroalgae of the Baltic Sea area. Acta Botanica Fennica 155. 55 pp.
- Nordberg, K., Löfstedt Filipsson, H. & Malmgren, B. 1999. Oceanographic Conditions in the Deepest Parts of the Kattegat, Scandinavia, Revealed Through Recent Benthic Foraminifera and Hydrography. Estuarine, Coastal and Shelf Science 49, 557-576. Article No. ecss.1999.0511. Available at: http://www.idealibrary.com [Viewed: 13 October 2011]
- Oceana 2010. Proteccion de la Zona Marina frente a Jaizkibel y Ulia, Euskadi. Propuesta científica para la creación de un corridor ecológico marino entre Donostia (Ulia) y Biarritz, mediante su inclusión en la Red Natura 2000. 92 pp. Available at: http://eu.oceana.org/en/eu/media-reports/publications [Viewed: 13 October 2011]
- Offshore Center Denmark. Available at: http://www.offshorecenter.dk/teknologi-vindmoeller.asp [Viewed: 13 October 2011]
- OSPAR 2003. OSPAR List of threatened and/or declining species adopted in 2003. Available at http://www.ospar.org/content/content.asp?menu=00730302240132_000000_000000 [Viewed: 13 October 2011]
- OSPAR 2008. Case Reports for the OSPAR List of Threatened and/or Declining Species and Habitats. Biodiversity Series. 261 pp.
- Parmanne, R. 2001. Silakan poikasten runsaus Suomen rannikolla vuosina 1974-1996. Kalatutkimuksia 170: 1-44. [Summary in English]
- Rosenberg, R., Nilsson H. C., Hellman B. & Agrenius S. 2000. Depth Correlated Benthic Faunal Quantity and Infaunal Burrow Structures on the Slopes of a Marine Depression. Estuarine, Coastal and Shelf Science 50, 843-853.
- Sandberg, E. & Bonsdorff, E. 1990. On the structuring role of Saduria entomon (L.) on shallow water zoobenthos. Ann. Zool. Fennica, 27, p. 279-284.
- The Sound Water Cooperation. Available at: http://www.oresundsvand.dk/English/ [Viewed: 13 October 2011]
- Schubert, H. & Blindow, I. (eds). 2003. Charophytes of the Baltic Sea. The Baltic Marine Biologists Publication No. 19. Koeltz Scientifi c, Königstein.
- Sørensen, K. T. 2005. Beskyttelse af havnaturen i indre danske farvande - status og anbefalinger. WWF Danmark. 84 pp.
- Torn, K., Martin, G., Kukk, H. & Trei, T. 2004. Distribution of charophyte species in Estonian coastal water (NE Baltic Sea). SCI. MAR., 68 (Suppl. 1): 129-136.
- Tvärminne Zoological Station, University of Helsinki. Faculty of Biology and Environment. Available at: http://luoto.tvarminne.helsinki.fi/english/enviroment.html [Viewed: 13 October 2011]

- Ulrich, Von J., 1983. Zur Bathymetrie und Topographie der nördlichen Kattegat-Rinne. Meeresforsch. 30: 61-68.
- Ulrich J., Eisele A. (1993) Die Kattegat-Rinne, Erläuterungen zu einer neuen Tiefenkarte. Dtsch Hydrogr Z 45:15-29.
- UK BAP. UK Biodiversity Action Plan, Priority Habitat Description. Available at: http://tna.europarchive.org/20110303145238/http://www.ukbap.org.uk/default.aspx Last accessed in 29/09/2011 [Viewed: 13 October 2011]
- UN WSSD (United Nations World Summit of Sustainable Development) 2002. Johannesburg Declaration on Sustainable Development. Available at: http://www.un-documents.net/jburgdec.htm [Viewed: 13 October 2011]
- Vindkraftprojekt Södra Midsjöbanken, Samrådsunderlag 2011-05-16. E.ON.
- Winsor, P., Rodhe, J., Omstedt, A. 2001. Baltic Sea ocean climate: an analysis of 100 yr of hydrographic data with focus on the freshwater budget. Climate Research 18: 5-15.
- Virtasalo, J. J., Leipe, T., Moros, M. & Kotilainen, P. 2011. Physicochemical and biological influences on sedimentary-fabric formation on a salinity and oxygen-restricted semi-enclosed sea: Gotland Deep, Baltic Sea. Sedimentology, 58: 352-375.
- Ærtebjerg, G., Andersen, J. H., Hansen, O. S. (eds.) 2003a. Nutrients and Eutrophication in the Danish Marine Waters. A challenge for Science and management. National Environmental Research Institute, 126 pp.
- Ærtebjerg, G., Carstensen, J., Axe, P., Druon, J.-N., Stips, A. 2003b. The 2002 Oxygen Depletion Event in the Kattegat, Belt Sea and Western Baltic. Thematic Report (HELCOM 2003). Helsinki Commission. Baltic Sea Environment Proceedings 90: 64 pp. Available at: http://www.helcom.fi/stc/files/Publications/Proceedings/bsep90.pdf [Viewed: 13 October 2011]

This publication and all related research was completed by **Oceana.**

Project Directors • Xavier Pastor, Anne Schroeer

Authors • Hanna Paulomäki, Christina Abel, Ricardo Aguilar

Geographic Information System • Jorge Ubero

Editor • Marta Madina

Editorial Assistants • Andrzej Białaś, Signe H. Damkjær, Martyna Lapinskaite, Aitor Lascurain, Angela Pauly, Ángeles Sáez, Natividad Sánchez

Cover • Dead man's fingers (*Alcyonium digitatum*), Kattegat, Denmark. © OCEANA/ Carlos Minguell
Isopod (*Saduria entomon*), Northern Baltic Proper, Estonia. © OCEANA/ Carlos Suárez
Edible crab (*Cancer pagurus*) with barnacles (*Balanus crenatus*), Kattegat, Denmark © OCEANA/ Carlos Minguell.

Index • Diver in West Bernāti, Latvia. © OCEANA/ Carlos Suárez
Close-up of shorthorn sculpin (*Myoxocephalus scorpius*) eye with leech (*Piscicola geometra*). © OCEANA/ Carlos Minguell
Kelp (*Laminaria saccharina*) growing on whelk (*Buccinum undatum*), Kattegat, Denmark. © OCEANA/ Carlos Minguell
Pond snail (*Radix peregra*), Bothnian Sea, Sweden. © OCEANA/ Carlos Minguell
Striped seasnail. (*Liparis liparis*), Kattegat, Denmark. © OCEANA/ Carlos Minguell.

Design and layout • NEO Estudio Gráfico, S.L.

Photo montage and printer • Imprenta Roal, S.L.

Acknowledgments • This report was made possible thanks to the generous support of the **Arcadia** and **Zennström Philanthropies**.

Our thanks to following persons and institutions for all information, documents and other help provided.

Denmark: Michael Olesen (Marine Biological Section, Department of Biology, University of Copenhagen), Anja Gadgård Boye (the Danish AgriFish Agency, Ministry of Food, Agriculture and Fisheries), Jos Kielgast (University of Copenhagen), Orbicon, Lone Reersø Hansen (the Danish Nature Agency, Ministry of the Environment), Ole S. Tendal (Natural History Museum, University of Copenhagen).

Estonia: Liina Vaher (Officer, Estonian Ministry of Environment).

Finland: Inkeri Ahonen (Ålands landskapsregering), Penina Blankett (Ministry of the Environment), Essi Keskinen (Metsähallitus), Kirsi Kostamo (Finnish Environment Institute), Marcus Lindholm (Ålands landskapsregering), Esa Niinivirta (Ministry of Environment), Markku Viitasalo (Finnish Environment Institute).

Germany: Dieter Boedeker (Federal Agency for Nature Conservation, Isle of Vilm), Romy Schroeder (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Protection of the Marine Environment, International Law on the Protection of the Marine Environment).

Latvia: Diana Kampane (Ministry of Environmental Protection and Regional Development).

Lithuania: Dziugas Anuskevicius (Protected Areas Strategy Division, Ministry of Environment), Algirdas Klimavicius (Protected Areas Strategy Division, Ministry of Environment).

Poland: Andrzej Ginalski (General Directorate for Environmental Protection, Natura 2000 Department).

Sweden: Johnny Berglund (Västerbotten county), Lars Gezelius (Östergotlands county), Maria Kilnäs (Västra Götalands county), Mikael Lindberg (Uppsala county), Cecilia Lindblad (Swedish Environmental Protection Agency), Marie Löfberg (Skåne county), Fredrik Nordwall (Swedish Agency for Marine and Water Management), Cecilia Nyberg (Gävleborg county), Lotta Nygård (Västernorrland county), Anne-Li Stenman (Swedish Environment Protection Agency), Eva Stighäll (Swedish Environment Protection Agency), Karl Svanberg (Södermanland county).

December 2011

ARCADIA

zennström
PHILANTHROPIES

OCEANA

Plaza de España - Leganitos, 47
28013 Madrid (Spain)
Tel.: + 34 911 440 880
Fax: + 34 911 440 890
europe@oceana.org
www.oceana.org

Rue Montoyer, 39
1000 Brussels (Belgium)
Tel.: + 32 (0) 2 513 22 42
Fax: + 32 (0) 2 513 22 46
brussels@oceana.org

Nyhavn 16, 4 sal
1051 Copenhagen (Denmark)
Phone: + 45 33151160
baltic@oceana.org
baltic.oceana.org

1350 Connecticut Ave., NW, 5th Floor
Washington D.C., 20036 (USA)
Tel.: + 1 (202) 833 3900
Fax: + 1 (202) 833 2070
info@oceana.org

33 Cor. Regent and Dean St.
Belize City, Belize, C.A.
Tel.: + 501 227 2705
Fax: + 501 227 2706
belize@oceana.org

Av. Condell 520,
Providencia, Santiago (Chile)
CP 7500875
Tel.: + 56 2 925 5600
Fax: + 56 2 925 5610
americadelsur@oceana.org

E.C.F

PAPEL RECICLADO 100%