

Limitless voyage of

DISCOVERY

UNDER THE SEA IN THE NATIONAL PARKS KOSTERHAVET & YTRE HVALER



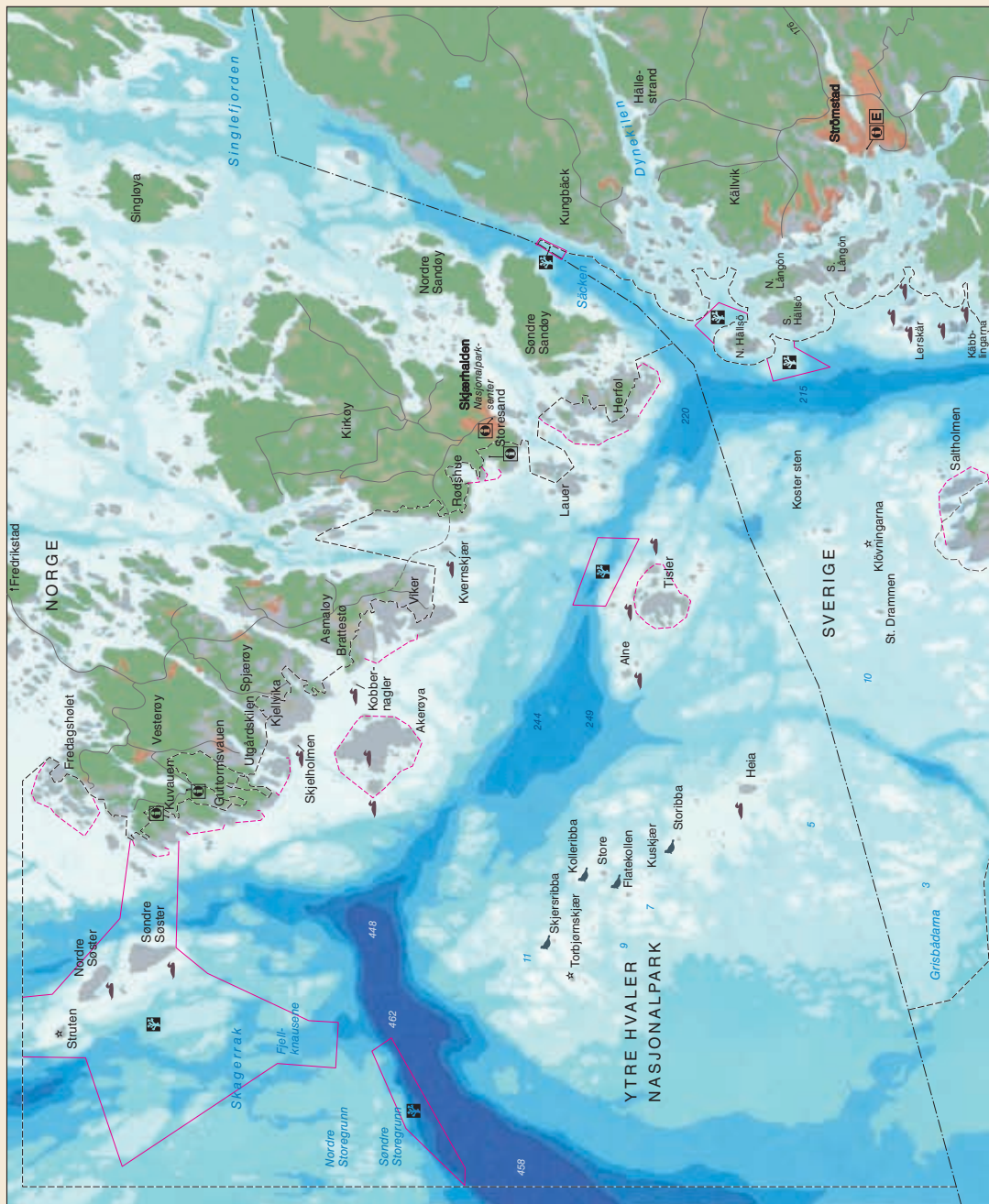


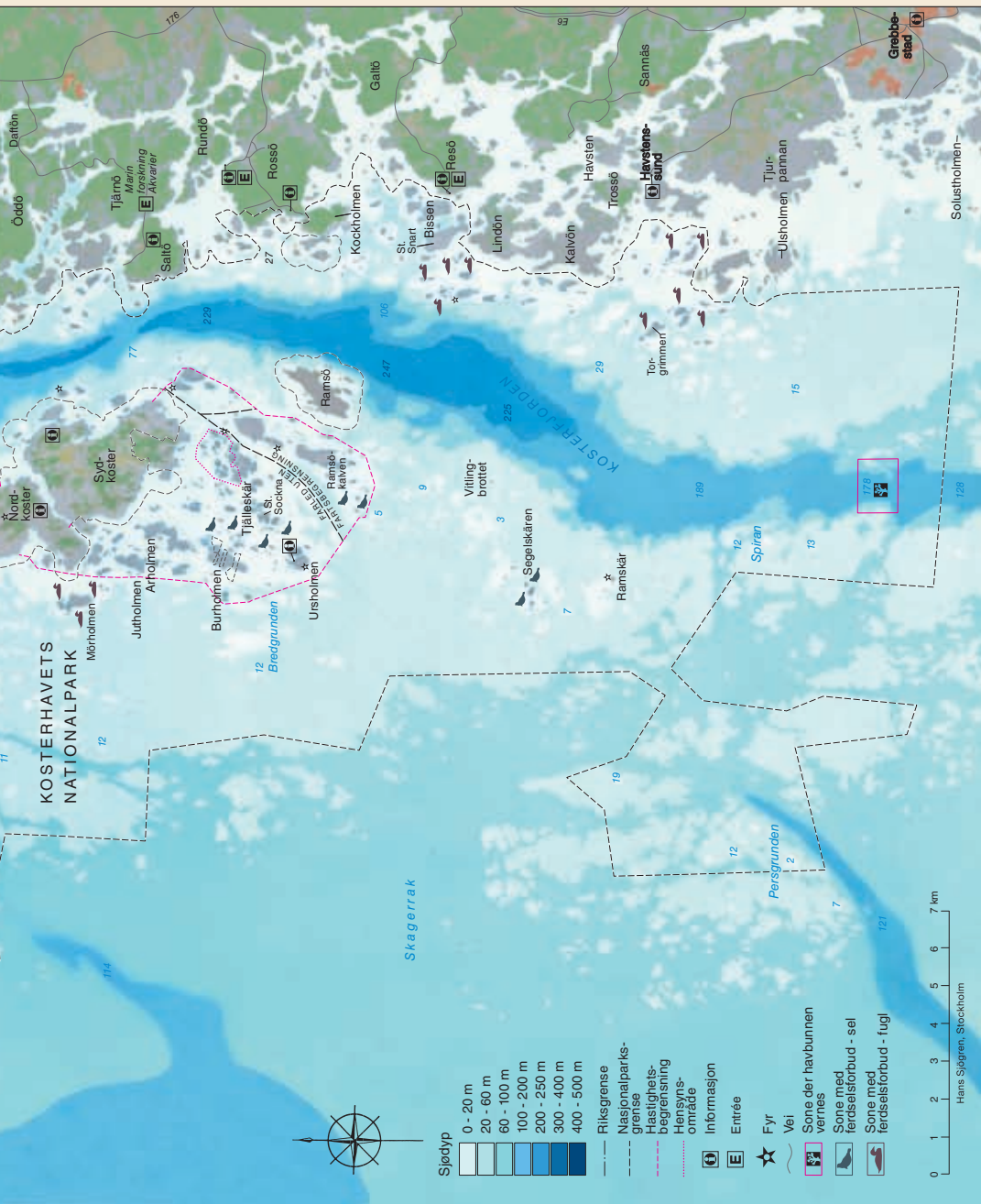
THE SEA

HAS NO BORDERS

Kosterhavet and Ytre Hvaler are the first national parks in Sweden and Norway to protect wildlife under the sea. Together they make up an area of almost 800 square kilometres of sea and archipelago that contain an unusually rich marine environment. Waves and currents are in constant motion over the boundary, seals and mackerel swim back and forth, and on the sea bed the forests of seaweed and meadows of seagrass grow freely. Come and experience the excitement in the border country!

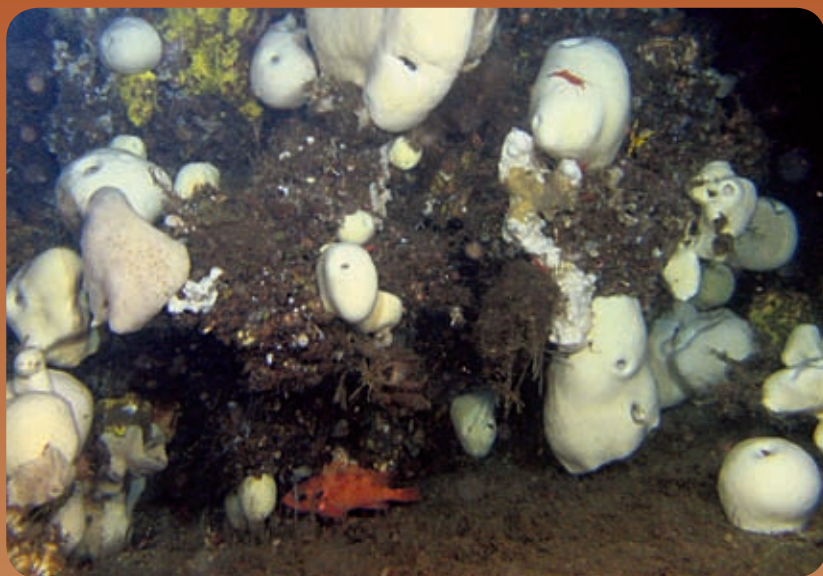
*The lion's mane jellyfish - one of the many
crusaders in the cross border national
parks of Kosterhavet and Ytre Hvaler*







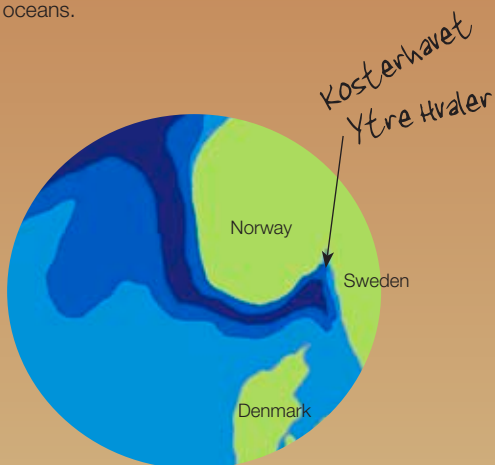
SPECIES **RICH** LANDSCAPE



Hidden under the sea in the national parks is a rich and varied underwater landscape: cliffs and deep valleys, dark clay sea beds, forests of seaweed and rocky reefs, shallow bays and narrow straits. The variation of habitats and ecosystems creates conditions for an unusually rich flora and fauna. With over 6000 different marine seaweeds and animals, Kosterhavet is the most species-rich marine environment in Sweden. From a Norwegian perspective Ytre Hvaler is also special. That there is such a diversity of species and habitats in one area is unusual, but the area also contains one of the Atlantic's largest cold water coral reefs in an inner archipelago location, Tislerrevet.

A PATCH OF THE OCEAN

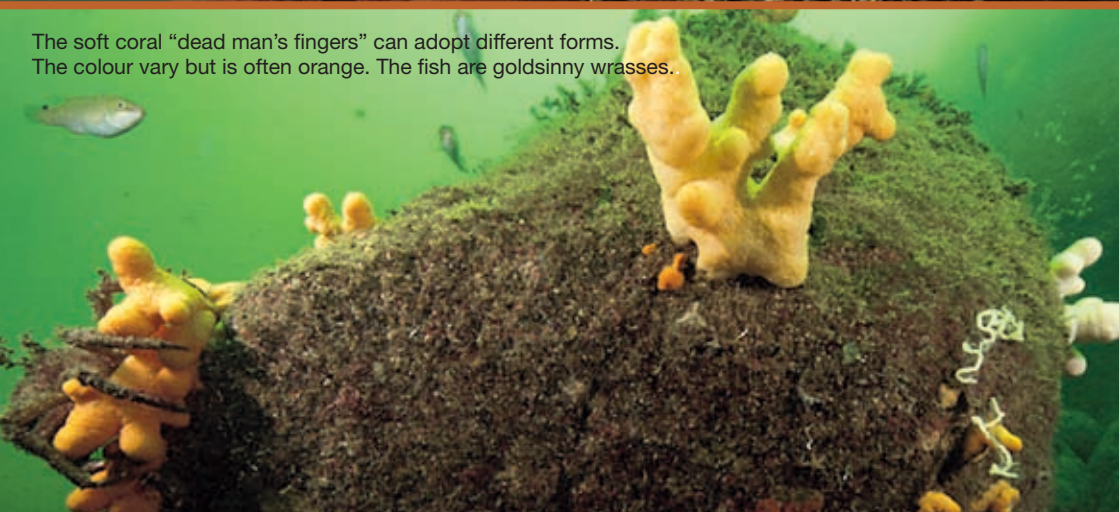
From the deep waters of the open Atlantic, the Norwegian Trench connects Kosterhavet and Ytre Hvaler to the great oceans.



Seaweeds do well in the strong, salty water currents in the outer archipelago.



The soft coral “dead man’s fingers” can adopt different forms. The colour vary but is often orange. The fish are goldsinny wrasses.



In Kosterhavet and Ytre Hvaler there are many strange and unusual sponges. Some species contain substances which can be used in medicines or for preventing fouling growth on the bottom of boats.



THE DARK & SALTY DEEP

Many of the deep water animals in Kosterhavet and Ytre Hvaler are associated with the dramatic underwater landscape with faults along the sea bed and deep basins. Strong currents are created by the narrow channels and shallow banks. These keep the cliff walls free from sediment and allows for a species rich fauna of sponges, lamp shells and corals.

Protective display of colour

Many deep water living animals have a beautiful red colour, but only when we shine our torches on them. In their natural habitat they are a dark, grey black colour which means that they are less likely to be spotted by predators. The explanation is that the only light which reaches down to the depths where these animals live – the green – is completely absorbed by the red pigment. The animals therefore look dark because they reflect very little light.

The compost of the sea

Where the sea bed is deeper than 30 metres darkness prevails. No plants can survive, only animals. Many of them are attached to the bottom and filter their food from the water with the help of tentacles and fine filters. In the softer sediments more than a hundred metres down, bristle worms, brittle stars and sea urchins dig down. They eat dead animal and plant material which sinks slowly from the surface.

You can see many of the deep sea animals at the aquarium at the Lovén centre on Tjärnö

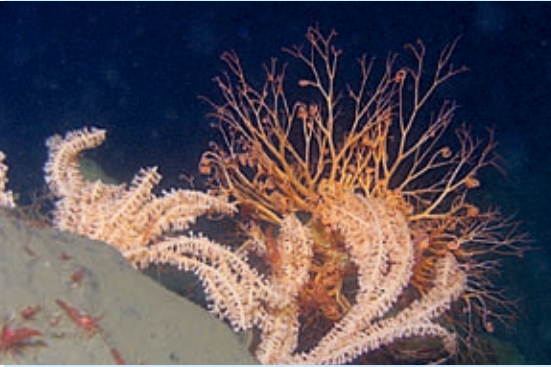


The national parks' deepest sea beds:

- Kosterhavet: 247 m
- Ytre Hvaler: 462 m



Deep water cliff walls are species rich habitats with many unusual sponges, anemones and mussels. They filter plankton and particles from the water which flows rapidly past. These currents also ensure that the animals do not get covered in silt.



Sea fans (left) are Cnidarians. Sitting on the top is a remarkable basket star. It catches prawns and other small animals with tiny claws on its many arms. **Euro-pean giant file clams** can be up to 20 cm long. The white "ball" is a deep water sponge.



Sea pens (left) and **tube anemones** are related to corals and jellyfish. They sit still with their foot buried in the sediment but they can also move forward slowly. The animals are sensitive and can easily be damaged by anchors and fishing trawls that are dragged along the bottom.



Norway lobsters dig holes in the soft sea bed. Crustaceans have a good sense of smell and find both food and a mate this way. Their smell organs sit on small hairs on the antennae.



BUSY CORAL REEFS

The coral reefs are the most species rich habitat in the sea. In Kosterhavet and Ytre Hvaler sixteen living reefs have been found so far with the cold water coral, *Lophelia pertusa*. Only one of these is found in Sweden, at Säckan north of Strömstad. The large reef at Tisler is more than a kilometre long and a couple of hundred metres wide. The shallowest parts of the reef are approximately

70 metres under the surface. In contrast to its tropical relatives the cold water coral can live in the dark and is therefore found deep down where the salinity is both high enough and stable. Living on and around the reef are hundreds of anemones, brittle stars, crustaceans, sponges, hydroids and other sea creatures. There are also lots of fish.

A coral reef can be very old. The reefs in Kosterhavet and Ytre Hvaler began to form around 8000 years ago



The bristle worm
Sige oliveri has only been found on reefs with the cold water coral *Lophelia pertusa*. It is a couple of centimetres long and finds its prey with the help of smell and feeling.



The peacock worm's (left) tentacles form a dense crown around the mouth and can be ten centimetres in diameter. **Feather stars** (right) catch plankton and other small particles with their outstretched arms.



The coral animals live in the white tubes made of calcium carbonate (lime). They catch small animals and plankton with their tentacles. The cold water coral *Lophelia pertusa* grows slowly, just a few millimetres a year. To the right is a **deep water sponge** called *Geodia baretii*. You can also catch a glimpse of some **feather stars**.



Different types of fish congregate on the reef, where they find both food and shelter. The picture of a **thorny skate** photographed on Tislerrevet is now a rare guest in our coastal waters.



AMONG THE **SURF** & KELP

From Torbjørnshjør in the north-west to Segelskären in the south, a large shallow and undulating off-shore bank stretches through the national parks. The whole area is very exposed to waves and currents from the outer Skagerrak. This means that the salinity of the water is high, despite the proximity to the shore and the fresh water outflows from the Glomma and other rivers. On the shallow and rocky sea beds lush beds of seaweed grow. Here you can find kelp, which grow in forests of almost a metre

high where fish, lobster and edible crab can be found. Here and there, are small pockets where the sea bed is covered in shell-gravel. Only a few species of seaweed and animals can cope with living in these areas, because strong currents mean that the seafloor is always on the move.

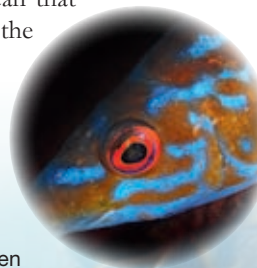


Starfish

prize open the shells of large mussels with their arms. A gap of only one millimetre is enough for them to push their stomach into the mussel and start eating.

The cuckoo

wrasse is born as a female but changes sex when she gets bigger. The male is a beautiful blue colour.



The great scallop

has small eyes on the edge of the mantle and can distinguish between light and dark. It can swim by opening and closing its shell quickly.



Kelp is

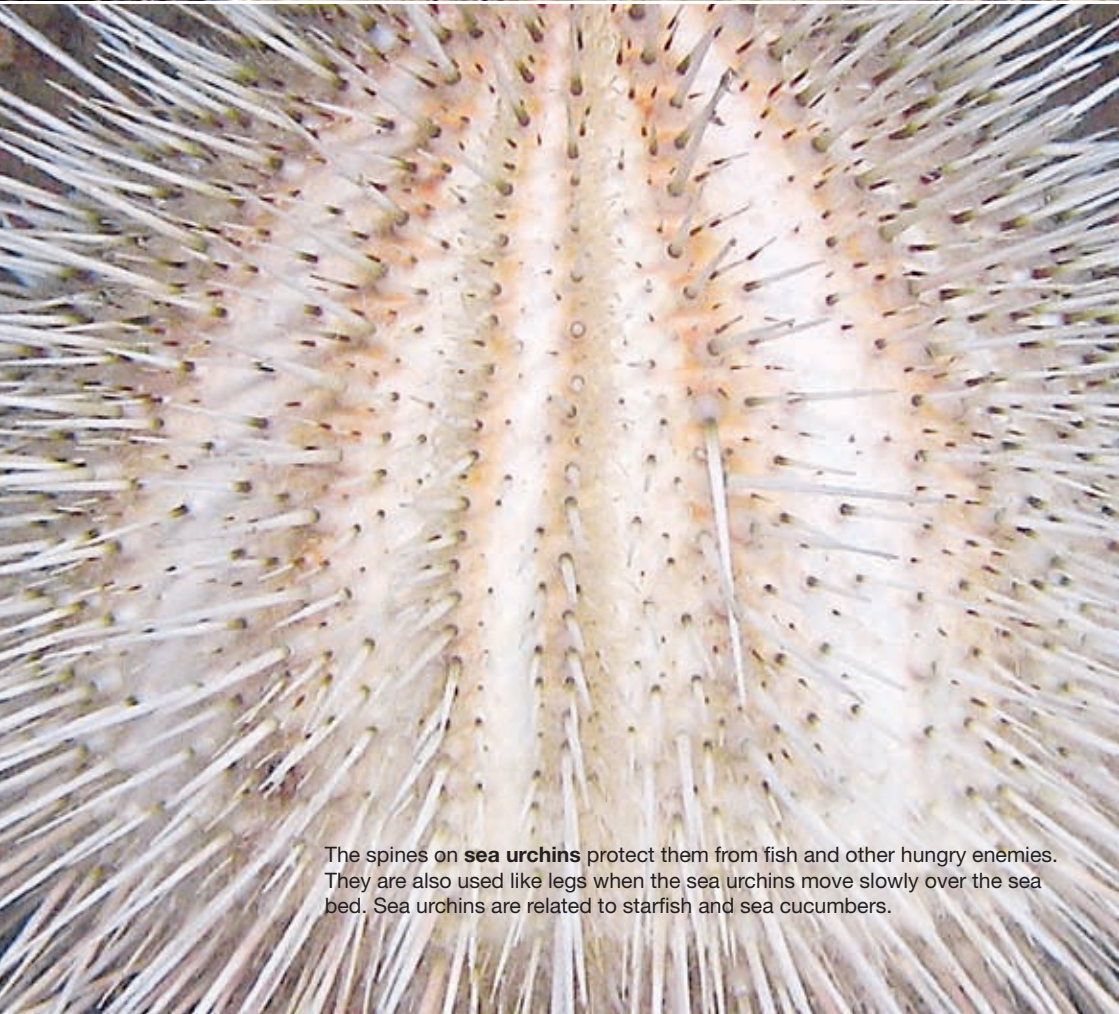
a large brown seaweed. It contains alginate, a compound which is used to give a soft consistency to foods such as ice cream.

The edible crab does not shy away from long walks. The females can wander more than 100 kilometres across the sea bed.





In the kelp forests of the outer archipelago, **common seals** dive for fish. Islands and islets are important nurseries where the cubs are born and suckled. Please respect therefore, the seal protection areas in the national parks.



The spines on **sea urchins** protect them from fish and other hungry enemies. They are also used like legs when the sea urchins move slowly over the sea bed. Sea urchins are related to starfish and sea cucumbers.




SHALLOW **BAYS** & EELGRASS


In the bays and straits of the archipelago, the sea bed is soft and made of clay and sand. They often have good places for swimming. Large numbers of mussels, shellfish, small crustaceans and bristleworms live in

the sediment. The shallow soft sea beds are very productive and important nursery grounds for flatfish such as European plaice. Eider, red breasted merganser and other sea birds feed in these areas.


Snorkel and discover!




The **hermit crab** does not have a shell of its own and lives in empty shells. As it grows it swaps to a larger and larger home.



The empty shells of the **common cockle** often lie washed up on the shore. They burrow down in the sandy sea beds when alive. Look out for the small round breathing holes made by the cockles.



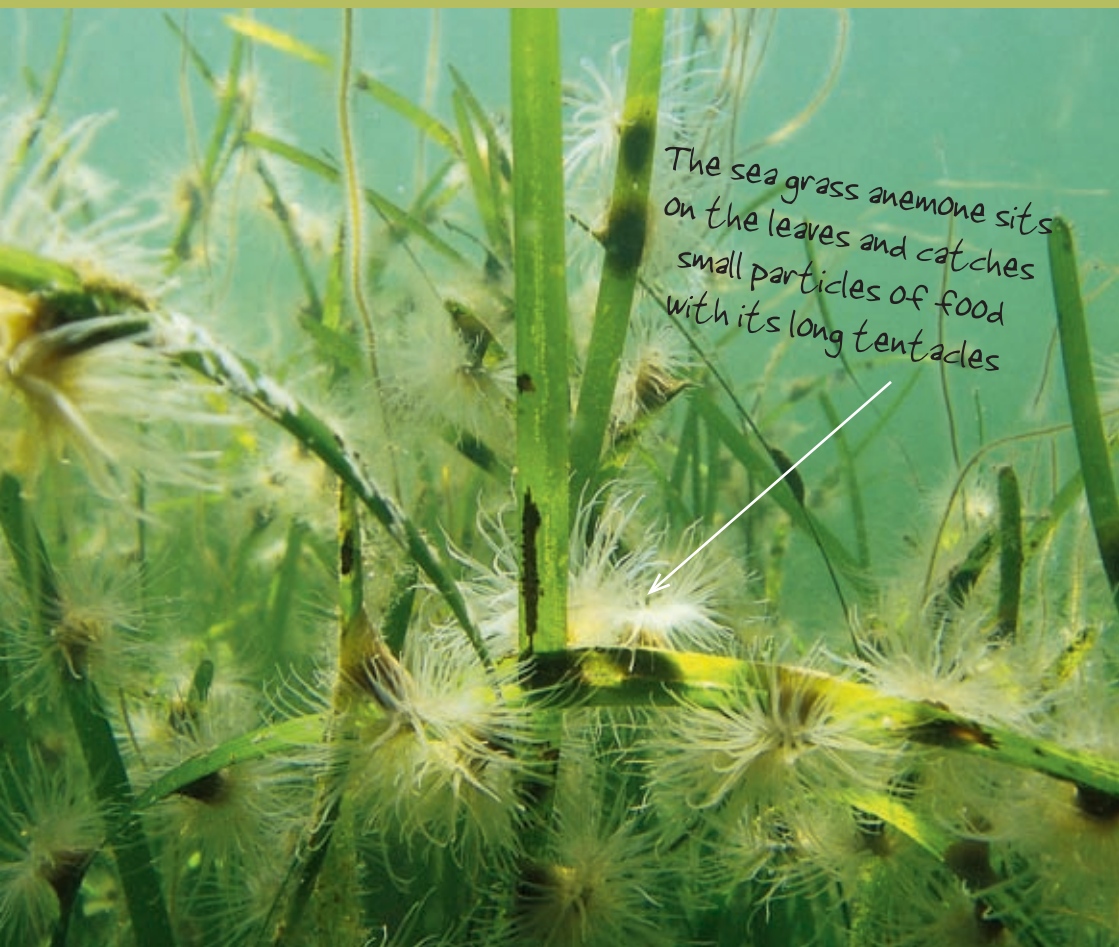
The **american jack knife clam** has been introduced from North America.



The elegant **baltic prawn** lives amongst the seaweed near the shore. It flees backwards at jet speed when it gets a fright.

The **painted goby** males attract females to lay their eggs under an empty mussel shell. Then he stands guard and watches until the young have hatched.





MEADOWS UNDER THE SURFACE

Here and there you can see long slender emerald green leaves lying and floating on the surface. This is common eelgrass which is a type of seagrass and can form extensive underwater meadows. In the winter the meadows wither away and their size can vary significantly from year to year. The meadow's protective environment attracts small animals and fish in large numbers. Eelgrass meadows are important feeding grounds for young cod and eel.



Sea slug



PROTECTION & MANAGEMENT



National parks are set up to protect large coherent natural areas; for nature itself but also to provide the opportunity for enjoying the countryside. Both Kosterhavet and Ytre Hvaler are situated in areas which are continually used for recreation. There is also a commercial fishing industry in the area. To conserve the valuable species and ecosystems there are different zones where particular regulations apply. By respecting these you ensure that future generations can also enjoy the unique marine and archipelago wildlife!


Ongoing monitoring

The condition of the marine environment is monitored regularly in both national parks. By following the development of species and


habitats, any deterioration can be identified and management put in place when necessary.

Please remember!


You are a guest in the national parks on nature's terms. Respect the plants and animals and be considerate of other visitors who want peace and quiet. Take your rubbish home or put it in a bin. There are particular regulations for boat traffic, including speed limits in certain areas. For more details about what applies, seek for information in the respective national park.



The **European oyster** is a delicacy found in the national parks. Please note that it is not permitted to pick oysters in Kosterhavet.



Deep water **shrimp** fishing takes place in both parks but with certain limitations. In sea bed protection areas it is forbidden to set anchor, use a bottom trawl or other equipment which may damage the sea bed.



Lobster is fished both in Sweden and Norway. At Kvern skjær, between Kirkøy and Asmaløy, there is a reserve where lobster is protected and cannot be caught.

Kosterhavet and Ytre Hvaler are the first national parks in Scandinavia with a focus on the wildlife under the sea. Kosterhavet lies in northern Bohuslän in Sweden, and Ytre Hvaler in Østfold fylke in Norway. Together both national parks form a large marine archipelago with a rich variety of marine habitats and species. There are several entrance points to the national parks which have information for visitors. The national park centre for Ytre Hvaler is in Skjærhalden. An equivalent is planned for Kosterhavet on the island of Koster. In suitable areas special snorkelling trails will be marked out under the water. You are welcome to swim, snorkel and dive in the national parks' salty underwater world!

More information

Kosterhavet and Ytre Hvaler national parks have local management organisations where as well as the local authorities, commercial fishermen, district councils, archipelago communities and other interested parties are represented.

County Governor of Østfold
Tel: + 47 69 24 70 00

Kosterhavet management, The County Administrative Board of Västra Götaland
Tel: + 46 31 60 50 00, out of hours: + 46 526 200 03

Norwegian Nature Inspectorate (SNO)
Tel: + 47 73 58 05 00

Skjærgårdstjenesten
Tel: + 47 99 88 59 52, + 47 480 73 476

Tjärnö Aquarium, Lovén centre/University of Gothenburg,
Tel: + 46 526 686 00

Ytre Hvaler national park centre, Skjærhalden
Tel: + 47 69 37 50 00, + 47 908 58 703

www.kosterhavet.se
www.ytrehvaler.no



SWEDISH ENVIRONMENTAL
PROTECTION AGENCY



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VÄSTRA GÖTALANDS LÄN
County Administrative Board



EUROPEAN UNION
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The County Governor of Østfold