

# The North Sea and Skagerrak

## Innholdsfortegnelse

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Published 20.03.2013 by Norwegian Environment Agency

The North Sea and Skagerrak are more strongly influenced by human activity than the Norwegian Sea and the Barents Sea: they contain some of the busiest shipping routes in the world and support intensive fisheries and a large-scale oil and gas industry. Climate change and ocean acidification are expected to have increasing impacts in the future.



There is a great deal of oil and gas activity in the North Sea, and many of the fields are ageing. The industry is responsible for releases of greenhouse gases, acidifying gases, oil and other chemicals. Photo: iStockphoto.com



The North Sea is intensively fished, and the total annual harvest is about 2 million tonnes. Catches have declined to 2012, but have decreased since then. and Norway and the EU countries agree that the area has been overfished. Photo: iStockphoto.com



Maritime traffic is extremely heavy in the North Sea and Skagerrak, and some of the world's busiest ports and shipping terminals are situated around the southern half of the North Sea. Pollution loads are therefore higher and there is a greater risk of the introduction of alien species in these waters than in Norway's other sea areas. Photo: iStockphoto.com



Sandeels feed on zooplankton and are a vital link in the food chain because they are an important prey species both for seabirds and for other fish such as cod, saithe and herring. Photo: Nils Aukan, UWVPhoto





Stavanger harbour. More and more of the Norwegian coastline is being developed for housing and holiday homes. Coastal waters and islands and skerries are being used more intensively, and there is a growing volume of recreational motor boat traffic. This can disturb vulnerable coastal biotopes such as breeding and wintering sites for birds and put pressure on coastal shellfish and fish stocks. Photo: iStockphoto.com

## STATE

# The North Sea strongly influenced by human activity

The North Sea is a relatively shallow, semi-enclosed sea, fed by several large rivers. There are important fishing banks that support stocks of saithe, haddock, herring and other species. Marine mammals in the area include minke whales, grey seals and porpoises. Seabirds such as gulls and terns, fulmars and auks nest along the Norwegian coast of the North Sea and Skagerrak.

## Ecosystems under pressure

All parts of the North Sea and Skagerrak are influenced by human activity, though to varying degrees. This is putting pressure on ecosystems and on animals and plants at all levels in the food web. Some of the changes that have been observed in conditions in the North Sea and Skagerrak can be linked directly to human activity. In other cases, the causal relationships are more complex and human activity is only one of the factors involved.

## Important fish stocks have declined

Spawning stocks of some important fish species, such as whiting and cod, are now under the precautionary levels set by fisheries scientists, partly as a result of fishing pressure. Some species that used to be relatively common in the North Sea have disappeared or declined, including European eel, blue skate and spiny dogfish.

## Seabirds and seals are vulnerable

Some seabird populations have declined in recent years. For example, common gull numbers are dropping, and the species is now classified as near threatened on the Norwegian Red List. The reasons for its decline are not yet understood, but may be a combination of climate change, poorer food supplies and habitat disturbance.

The common seal is a coastal species and is classified as vulnerable on the Norwegian Red List. In addition to animals that are killed legally during hunting, an unknown number die after becoming entangled in fishing gear, and some are probably killed illegally.

## Sandeels – a key species in seabed communities

Sandeels are benthic, schooling fish that live in shallow waters with a sandy substrate in parts of the central and southern North Sea. They feed on zooplankton and are a vital link in the food chain because they are an important prey species both for seabirds and for other fish such as cod, saithe and herring.

Sandeels are stationary because they are dependent on a specific habitat, coarse sandy substrate into which they can burrow. This means that they cannot shift to other areas if food supplies or other ecological conditions change. Because of the risk that the sandeel stock could collapse, sandeel fisheries have been restricted. If sandeels were to disappear from the North Sea, this could have serious impacts on other species that are dependent on them as prey.

Sandeels are an example of a species that is affected by many different human activities. Fisheries, oil production, the occupation of areas of seabed (for example by oil installations) and pollutants may all have negative impacts on its population. In addition, climate change may alter zooplankton distribution and thus the availability of food supplies for sandeels.

## IMPACT

### Concern about cumulative environmental effects

There is considerable concern about cumulative environmental effects on ecosystems in the North Sea and Skagerrak, particularly the impacts of hazardous substances, nutrients, bottom trawling and fisheries more generally, marine litter and underwater noise.

In the time ahead, climate change and ocean acidification are expected to intensify and have greater impacts, increasing ecosystem vulnerability. A higher sea temperature will result in changes in ecosystems. For example, warmer-water species such as sardines and anchovy are likely to become established, while other species disappear. Moreover, we know that CO<sub>2</sub> emissions are making the seas more acidic. Ocean acidification may become one of the greatest threats to marine life both in these waters and elsewhere.

It is difficult to assess the scale of cumulative environmental effects because in most cases there is insufficient information on particular species and on the complex interactions in ecosystems. In addition, it is difficult to assess how vulnerable an ecosystem is to change.

## PRESSURE

### Many pressures

The North Sea and Skagerrak and surrounding areas have been heavily used by people for many years. Today, a combination of intensive onshore industries, fisheries, fish farming, oil and gas production and shipping, together with wastewater discharges and runoff from agricultural areas, is putting great pressure on coastal and marine ecosystems.

There are considerable inputs of hazardous substances and radioactive substances to the North Sea and Skagerrak. Long-range transport from other countries accounts for much of this, but inputs from Norwegian sources are also important.

The highest levels of hazardous substances are found near the coast in the Skagerrak and Norwegian Trench. Marine litter is a growing environmental problem globally, and levels of marine litter are generally high in the Northeast Atlantic region. Sources of marine litter include most activities in and associated with the North Sea and Skagerrak.

There is concern about a number of these pressures, either because they may have major impacts on ecosystems or because of growing activity in a particular sector. Climate change and ocean acidification in particular are expected to become serious problems for coastal and marine ecosystems in the future. In addition, there is concern about the following:

- the possibility of oil and chemical spills as oil and gas production expands and the of shipping increases
- the growing numbers of new persistent substances that are being released into the marine environment, where they break down very slowly and can spread widely
- levels of persistent organic pollutants and heavy metals in seafood that exceed the maximum levels for human consumption
- the impacts of fisheries on stocks that have reduced reproductive capacity
- inputs of nutrients and organic matter
- inputs of marine litter
- pressure on habitats, including the seabed
- underwater noise.

The map shows shipping density and oil and gas activities in the Norwegian part of the North Sea and Skagerrak. You can click on the oil platform symbols to obtain more information about the different fields (some of this is available in English). Clicking on "Explore maps" opens the full map with access to more topics.

## RESPONSE

## Ecosystem-based management

Inputs of oil, nutrients and heavy metals to the North Sea and Skagerrak have been considerably reduced through cooperation between the North Sea countries. There has been a general improvement in the state of the environment as a result, but much still remains to be done at both local and regional level. For example, targets for releases of nutrients and hazardous substances have not yet been achieved.

Norway takes part in international cooperation under the OSPAR Commission, which includes reporting on the state of the environment, environmental monitoring and implementation of the Marine Strategy Directive by the EU countries in their sectors of the North Sea and Skagerrak. The implementation of the directive is expected to result in more focus on environmental efforts in the North Sea and Skagerrak .

### Norway's approach

Norway has already taken action at national level and has regulated sectors and industries that put pressure on the marine environment. This has had positive effects, but there is still much to be done in certain areas.

To improve the situation further, the Norwegian Government is now introducing integrated, ecosystem-based management of all Norway's sea areas.

This is a challenging task, because it means that all pressures on ecosystems must be assessed together, so that it is possible to identify the most cost-effective ways of improving the situation. In addition, the management regime must be designed to ensure that the overall pressure on the environment does not exceed the tolerance limits of ecosystems.

### Management plan for the North Sea and Skagerrak

Norway's objective is to manage activities that put pressure on the North Sea and Skagerrak so as to maintain the structure, functioning, productivity and diversity of the area's ecosystems. New activities and new pressures are also to be assessed in relation to existing pressures and cumulative effects on ecosystems.

An integrated management plan for Norway's part of the North Sea and Skagerrak is being drawn up, on the same pattern as the management plans for the Barents Sea–Lofoten area and the Norwegian Sea. An expert group with representatives of 14 different government agencies and research institutions finalised the scientific basis for the management plan in spring 2012. The management plan itself is due to be published in 2013.

Work on the management plan is being coordinated as closely as possible with international processes related to relevant EU directives, including the Marine Strategy Directive and the Water Framework Directive.