Status of the Barents Sea Ecosystem

Summary

The commercial fish stocks in the Barents Sea are, with a few exceptions, in a healthy condition. Positive trends are a growing capelin stock and increasing amounts of young redfish. In a long-term perspective, the water masses are warm, although, on average, not as warm as in 2006. The stock level of blue whiting in the Barents Sea, which is a more southern species, has decreased in 2007.

Ingolf Røttingen
ingolf.rottingen@imr.no
Head of the Barents Sea Ecosystem Programme

A clean ocean
Although wind and ocean currents transport various contaminants into the Barents Sea, the level observed in organisms is generally low. The main exception is top predators such as the polar bear, where persistent organic contaminants aggregate.

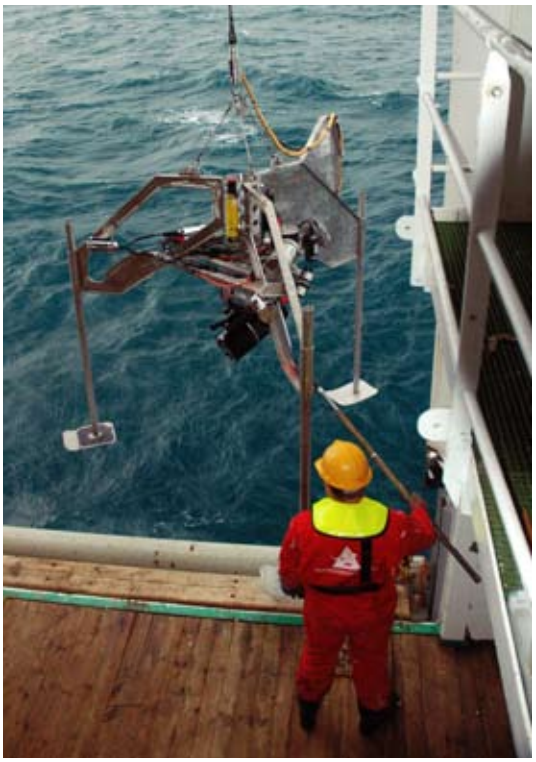
Decreasing levels of zooplankton
Compared with the two previous years, less zooplankton was observed in the Barents Sea in 2007. This may be due to a lesser amount of Atlantic water being transported into area, but grazing from an increasing capelin stock feeding mainly on copepods and krill, may have contributed to the decrease.

Capelin up, blue whiting down
Based on the number of immature capelin, the prognosis indicate an increasing capelin stock in the coming year. This is contrary to the prognosis for the other important plankton feeder in the Barents Sea, the young and immature stock (ages 1–4) of Norwegian spring spawning herring. The year classes 2005–2007 of this stock are smaller than previous years. A decreasing amount of blue whiting is recorded. For polar cod the stock situation seems unchanged.

Healthy stock of Northeast Arctic haddock
The size of the spawning stock of Northeast Arctic cod is slowly decreasing, but is still above the historical average. As in 2006, ICES emphasises that it is of great importance for the development of this stock that the IUU (illegal, unregulated, unreported) fishery the Barents Sea is stopped. The exact stock size for the Northeast Arctic haddock is difficult to determine. However, the spawning stock is at a relatively high level and strong immature year classes, which will recruit to the spawning stock in the coming years, are observed. The third major demersal fish stock in the Barents Sea, the Greenland halibut, is slowly recovering from a period below historic levels.

Unexpected fluctuations in bottom fauna biomass
Results of bottom fauna surveys in 2006 and 2007 show a remarkable reduction from one year to the next. Why the bottom communities show such unexpectedly high fluctuation, needs to be investigated.

Searching for birds, fish and whales in the Barents Sea.
Photo: Erik Olsen
På leting etter fugl, fisk og hval i Barentshavet.



Status of the Norwegian Sea Ecosystem

In the first half of 2007 the temperature was the highest measured in the southern Norwegian Sea since regular measurements started in 1977. The large stock of herring is in a very good shape, whereas mackerel and blue whiting, which partly use the Norwegian Sea as a feeding area, are both probably close to the precautionary limit. There is altogether more than 12 million tonnes of pelagic fish migrating through the area, feeding there through the summer. The high biomass of plankton feeding fish may explain the past years' decreasing trend in zooplankton biomass.

Harald Loeng
harald.loeng@imr.no
Head of the Norwegian Sea Ecosystem Programme

Summary

A clean ocean
IMR monitors contaminants in the Norwegian Sea every three years. In 2008, samples will be taken of water, sediments and fish. Samples from previous years have shown low levels of contamination.

High temperatures
The Atlantic water in the Norwegian Sea has been extraordinarily warm and salt since 2002. In 2007, the Atlantic water in the southeastern Norwegian Sea was 0.8 ºC warmer than normal. After the record-high volume transport of Atlantic water into the Norwegian Sea during winter 2006 it fell to a record-low during summer 2007.

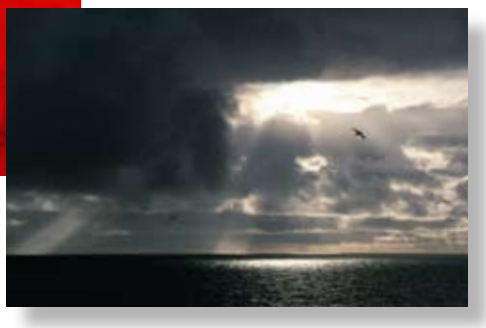
Less zooplankton in 2007
In major parts of the Norwegian Sea, lower abundances of zooplankton were measured in 2007 than the average for the past ten years. Plankton organisms uncommon to the Norwegian Sea are entering the area at an increasing rate, and some southern species are now observed as far north as the Bear Island region. Whether this is due to the increasing stocks of plankton feeding fish is uncertain.

Norwegian spring spawning herring on the increase
The Norwegian spring spawning herring stock is assessed to be in a very good condition. The spawning stock biomass is estimated at above 12 million tonnes, the same level as in the 1950s. On the other hand, the blue whiting stock reached its historic high in 2003 and has since then been declining because of heavy fishing pressure. 2006 was the first year the blue whiting fishery was regulated through international agreements, but this has not yet had a significant impact on the exploitation level. The level of the spawning stock biomass of mackerel is uncertain, but probably close to the precautionary limit. It fell to a record low in 2003, but a gradual increase has been evident the last few years. The fisheries are quota-regulated, with international agreements for all species. However, the fishery for blue whiting is too intensive. Among the demersal fish resources, the northern stock of saithe is in good shape.

Deep water resources partly in trouble
The situation for the Greenland halibut is uncertain. The stock is at a low level in a historical perspective. Nevertheless, both the total stock and the spawning stock in 2006 are estimated to be above the mean of the past 30 years. The fishery of ling, blue ling and tusk takes place in large parts of the North Atlantic. In the parts of the distribution area subject to the highest fishing intensity, the stocks are considered to be below the precautionary limit.

Interesting coral reef findings
Considering its size and the variety in water masses, depth and seabed conditions, the bottom fauna of the Norwegian Sea has been subject to very few investigations. In recent years, it is mainly the Mid-Norwegian shelf that has been studied and a great number of cold-water coral reefs have been documented. The continental shelf holds some of the largest cold-water coral reefs in the world.

Stabilised stock of hooded seals
Results from a survey conducted in 2005 suggested that the current pup production of hooded seals in the Greenland Sea was lower than observed in a comparable 1997 survey. In the past two decades, the stock appears to have stabilised at a low level, which may be only 10–15% of the level observed 60 years ago. ICES concludes that harvesting should not be permitted from 2007 on, with the exception of catches for scientific purposes.



Not since the 50s has there been this much herring in the Norwegian Sea.
Photo: Institute of Marine Research
Ikke siden 50-tallet har det vært så mye sild i Norskehavet.

Status of the North Sea and Skagerrak Ecosystems

The recruitment to the sandeel, Norway pout, North Sea cod and North Sea herring stocks has been poor for the last five–six years. This is probably caused by changes in the physical and biological conditions. The cod and sandeel stocks have been heavily exploited, and the recruitment failure is most likely due to over-fishing. Illegal landings and discards create considerable problems for the assessment of some stocks, particularly cod and mackerel.

Else Torstensen

else.torstensen@imr.no
Head of the North Sea Ecosystem Programme

Summary

Poor ventilation of bottom water

At the beginning of 2007, the temperatures in the North Sea were very high and remained high until autumn. Model simulations indicate that the inflow of Atlantic water into the North Sea was the lowest ever recorded, and winter cooling was much lower than the past few years. It is now three years since the Skagerrak bottom water was ventilated. Monitoring of nutrients indicates that the inflow of nitrogen-rich German Bight water in 2007 was relatively weak.

More southern zooplankton species

The divergences in 2007 from the long-term means were an earlier spring bloom (1 month), lower chlorophyll concentration during the summer, and the absence of an autumn bloom on the Norwegian side of the Skagerrak. In the past 20 years, changes have been observed in biomass, species composition and seasonal cycle of zooplankton. Higher temperatures have extended the distribution of several species northwards, and more southern species have increased survival in the North Sea. The cold-water copepod *Calanus finmarchicus* is in retreat and is only partially being replaced by the more southern *C. helgolandicus*.

Large oil spills

Two larger accidents in the North Sea in 2007 resulted in large oil spills; MS Server shipwrecked west of Bergen in January, and a pipe ruptured at Statfjord A in December. Samples of sea water and fish were collected and analysed. The sampling in December was restricted by bad weather conditions.

Continued poor recruitment

Sandeel has a central position in the ecosystem as prey for several important fish and whale species. The recruitment to the North Sea cod, haddock and herring stocks has been poor for many years. This is probably caused by changes in the physical and biological conditions. However, both the cod and sandeel stocks have been heavily exploited, and the recruitment failure is probably mainly due to this. The fishery for cod should have been stopped several years ago. The spawning stocks of haddock, mackerel and sprat are relatively good, while the spawning stock of herring is expected to be below the precautionary level.

The assessment of some fish stocks, particularly cod and mackerel, are very imprecise due to the poor quality of catch statistics. This is due to illegal landings and discards.

Southern fish and marine mammals

Sardines and anchovy had a wide distribution in 2007 and were caught together with sprat in the Norwegian sprat fishery early in the year. Influx of warm water into the North Sea also brings more exotic species on visit, such as common dolphin, striped dolphin and Risso's dolphin. Otherwise, the North Sea is dominated by three cetacean species; harbour porpoise, minke whale and whitebeaked dolphins.

Bottom fauna

IMR has had no activity on bottom fauna in the North Sea since the MAFCONS project was terminated in 2005. International studies to determine whether there had been any changes in the benthos community from 1986 to 2000, revealed that there had been no significant changes during this period. However, some species had fluctuated in numbers due to higher surface temperatures and local changes in the sediment.

Methodology for fishery independent measuring of the sandeel stock is being developed.
Photo: Tore Johannessen
Metodikk for fiskeriuavhengig måling av tobisbestanden er under utvikling.