



Protecting the environment of the Arctic ecosystem

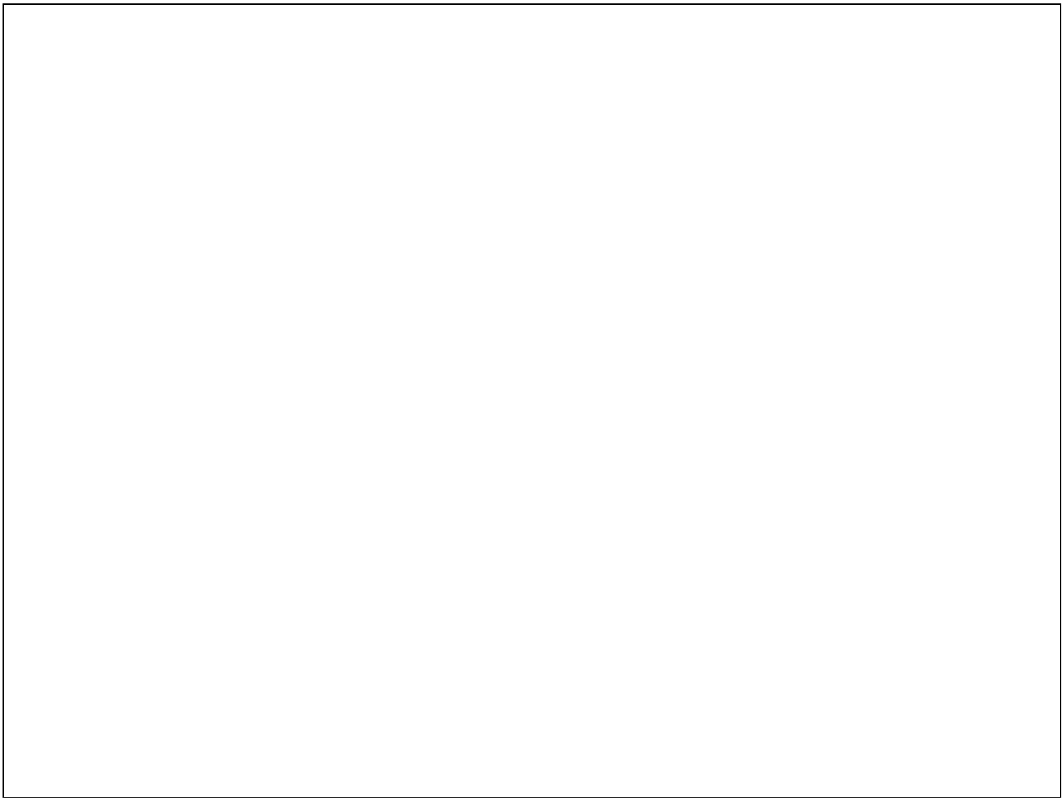
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Professor Olav Orheim
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Outline

- What is the Arctic?
- The Arctic marine environment
- Key environmental challenges

Integrated Management Plan for the Barents Sea

- Integrated management through collaboration and co-management
- Management by areas
- The integrated management planning process



Shipping is an important source of major oil spills via accidents and through illegal discharges. Major oil spills from shipping often occur close to land in vulnerable areas, and in the future tankers will be carrying large amounts of crude oil from North-western Russia and travelling close to the Norwegian coast. Together with increased interest in petroleum exploitation in the Barents Sea, this calls for preventive measures and preparedness for emergencies in order to limit damage. This demands close co-operation with the Russian authorities. But, in the Barents Sea region there is limited scope for effective protection against oil spills during the dark part of the year.

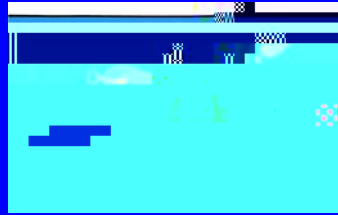
Though tourism has perhaps the greatest effects on land, marine systems can also be impacted by virtue of effects on important seabird nesting areas, moulting and birthing sites for seal, etc. Cultural remains associated with old hunting sites are often located right in these areas. According to the office of the Governor of Svalbard, the total number of landing sites outside the settlements and Isfjorden has been between 80–90 the last three years and between 20–25 000 persons have been on land. Ship traffic in connection with mining and settlement also present a challenge. Ships of a certain size and ice class, as well as comprehensive safety measures, are required, but these are expensive.

Relationships

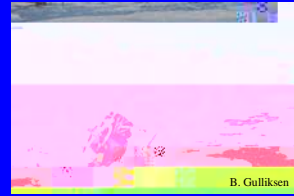
A population of fish is a
variable unit in which the

Petroleum hydrocarbons

- Several components
- Types of spills →
- Dispersal routes
- Environmental consequences
- Exploration Status on the Norwegian continental shelf →



Ministry of Petroleum and Energy



B. Gulliksen

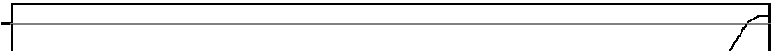


Born & Böcher (2001)

The southern part of the Barents Sea was opened up in 1989, cf. Parliamentary Report No. 40 (1988-89) on opening up the Barents Sea for oil prospection. Up to now 59 test wells have been drilled and according to the Norwegian Petroleum Directorate it is no more complicated to drill in the Barents Sea than in other parts of the Norwegian continental shelf. However, the areas around the Lofoten Islands and northwards from there contain some of the world's most important resources in terms of fish, sea birds and marine mammals. The physical and climatic conditions make the ecosystems very vulnerable to any impact, and the Government is therefore of the opinion that an impact assessment of year-round petroleum exploitation should be carried out for the areas stretching from the Lofoten Islands and northwards.

The Barents Sea (North of 74° 30') is not open for prospecting operations. An investigatory programme for the area was drawn up by the Ministry of Petroleum and Energy in 1991, but no impact assessment of the consequences of petroleum exploitation for the area has been undertaken. Many of the surveys planned pursuant to the investigatory programme were, however, carried out and the results of these are presented in a synthesis report.

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Arctic ice extent 1900 - 2000



Why the Barents Sea?

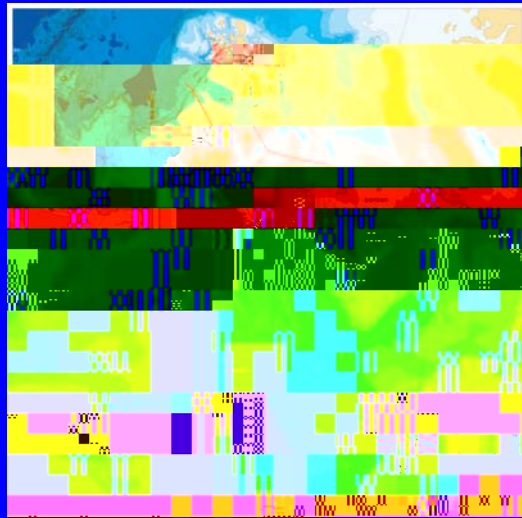
- **Economic sector**
 - Fisheries
 - Petroleum activity
- **Environmental considerations**
 - Biological production
 - Biological diversity
- **Other interests**
 - Geopolitical
 - Military

The ultimate objective is to establish Integrated Management plans for all of Norway's coastal and marine waters. As a first step the Government envisages drawing up an integrated management plan for the Barents Sea where overall account is to be taken of the environment, fishing activities, oil operations and shipping. Experience gained from this work can then be used as a basis for a decision to develop similar, integrated management plans for the Norwegian Sea and the North Sea.

There are many reasons why the Government wants to start with the Barents Sea and to establish frameworks for future activities in this area which ensure the preservation of the quality of the environment. This is a maritime area, which is exposed to human activities to a relatively small extent. It is one of the areas in the world, which has the most abundant populations of fish, sea birds and marine mammals that it is important to preserve for future generations. Many of the stocks merit international protection. The main characteristics of the ecosystems are known, but we know very little about how pollutants affect species and systems. Low temperatures and drift ice mean a lengthy degradation period for oil and chemicals discharged into the environment. These factors, along with high waves at times during the dark season of the year considerably reduce the scope for effective systems to deal with acute oil pollution. A weaker infrastructure in the provinces of Nord-Troms and Finnmark than that found in other parts of the country also makes it more difficult to deal with emergencies.

Geographical area

- The shelf break, the continental shelf, including the areas north of Svalbard and the Lofoten area
- Other areas – when natural for the description of a species
 - i.e. migrating species



The average depth in the Barents Sea is 230 m, but Storfjordrenna is 250–350 m deep and Bjørnøyrenna is 400–500 m. The deep channels on the continental shelf to the west of Svalbard are characterized by horizontal soft bottom resulting from accumulated sediments. It is well suited to bottom trawling and yields the greatest shrimp catches around Svalbard. In contrast many banks have relatively little sedimentation because of the strong current, others are retention areas, while Spitsbergen have depths of 20–100 m. Mixing reaches the bottom and cause a steady supply of nutrients at the same time as the there is sufficient light for production, resulting in one of the most productive areas in the Barents Sea.

Some species of fish and seabirds spend only parts of the year in the analysis area. Examples include Norwegian spring spawning herring, capelin and Northeast Arctic cod. The Barents Sea is an important nursery area for these species. For capelin and Northeast Arctic cod, it is also an important feeding area. Polar cod, a typical circumpolar fish, has its spawning, nursery and feeding areas in the Barents Sea. With the exception of ivory gull and black guillemot, most common seabird species migrate southward during the winter half of the year. Some whale species have polar feeding areas and temperate mating and calving areas (e.g. minke, fin and humpback whales), while others reside in the polar region the year round (e.g. white whale, narwhal and bowhead).