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# Petroleum-free zones in the Barents Sea

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# Foreword

Time is running out for the Barents Sea!

The most recent reports on climate change show that it is unjustifiable to further increase Norwegian petroleum exploration, whether it is to occur in the south or the north. However, the Norwegian government has decided to open the southern region of the Barents Sea for petroleum exploration. WWF is therefore currently concentrating our work on saving the most important places in this valuable sea area.

The Barents Sea fisheries and its spectacular wildlife and natural beauty are amongst the most impressive in the world. There is no area in Europe even close to the richness and diversity of the Barents Sea. However – even here – some areas are more important than others. In the Barents Sea this means spawning, nursing and living areas for some of the world's most valuable fish stocks, sea bird colonies, fantastic coral reefs and rare whale species. On land, we take it for granted that the most valuable and vulnerable areas are protected. The same should apply in the ocean.

Many years of experience, alongside the government's own figures and experts document that the environmental risk connected with petroleum operations is significant. The claim of the oil industry that they operate with "full control" is not correct. We can simply not expose the most important natural resources in the Barents Sea to the risk from petroleum exploration.

A large majority of the Norwegian population feel that the most important areas of the Barents Sea must be protected from the risk of acute oil spills. The people wait for – and trust that – the Government and Parliament will take responsibility and protect the natural resources from which Norway has lived for thousand years and will still be able to live from in all the years after the oil-age is over.

Despite this, there is a significant pressure from the oil companies, the conservative parties and strong powers within the Labour party and the Labour Union to open all of the Barents Sea to petroleum exploration – even around the Lofoten Island and other areas that are vital to the survival of the fisheries and the wildlife in the Barents Sea. New licences for oil and gas exploration will be announced in June this year. The Government is speeding up the process of identifying where the oil industry should start exploring, but so far, they are completely failing in fulfilling their promise to identify possible petroleum free areas in the Barents Sea.

This is why WWF in this report proposes five areas that should be permanently closed to all petroleum exploration, being Lofoten, Vesteraalen, LoppHAVet, Nordkapp, the coast of Finnmark and the Bear Island and the Polar front.

The proposal is based on two scientific reports identifying the most valuable areas in the Barents Sea, one by DNV – Det Norske Veritas and one by the Norwegian Institute of Marine Research, based on the best available knowledge about the marine environment. WWF urge for the Norwegian Government to avoid any of these areas when announcing new licences in June – and to make sure they get permanent protection.



A handwritten signature in black ink, which appears to read 'Rasmus Hansson'. The signature is written in a cursive, flowing style.

Oslo, 22 May 2005  
Rasmus Hansson,  
General Secretary, WWF-Norway

# Summary

Some areas are too vulnerable and valuable to be exposed to any risk from petroleum exploration. Based on reports by the Norwegian Institute of Marine Research and DNV Veritas, WWF in this report proposes that five petroleum free zones are established in Lofoten and the Barents Sea.

The Barents Sea has world class, extraordinary natural values. Here lives the worlds largest cod stock, some of Europe's largest seabird colonies, rare whale species and the world's largest cold water coral reef. The Arctic ecosystem here is rich and has for thousands of years supported coastal communities with food, employment and high value export products. After a century of marine science – we have knowledge about where fish spawns and migrates, coral reefs are discovered and mapped and important seabird colonies are well known. There are large gaps in our knowledge – but at the same time, we know that species and ecosystems can be seriously affected by acute oil spills and we know where the most vulnerable areas are.

The environmental science institutions in Norway, the Institute of Marine Research, The Pollution Agency, The Directorate of Nature Management and the Polar Institute all have recommended that no petroleum exploration should be allowed in the most sensitive areas in the Barents Sea. Based on the environmental impact assessment relating to all year round petroleum exploration in the Lofoten – Barents Sea and the recommendations from the scientific institutions, the Norwegian Government in 2003 decided not to allow petroleum exploration outside Lofoten. Since then, WWF has been waiting for the Government to complete its promise from the Governmental declaration in 2001 where it is stated that it will present a proposal for petroleum free zones in the Barents Sea. This has not yet happened – and the next round of announcing new areas for petroleum exploration is due in June 2005.

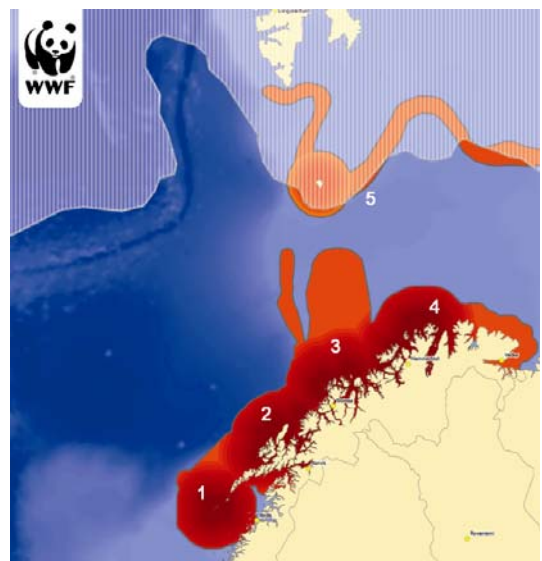
Since 1990, there has been over 2500 acute oil spills from the Norwegian petroleum industry. Searching, drilling and transporting of oil all include risks of an oil spill. The consequences on nature and society can be disastrous if an oil spill happens within some of the most important spawning areas, near large seabird colonies or in other particularly vulnerable areas. WWF wants to see that the most vulnerable areas in the Barents Sea get permanent protection from petroleum exploration. Therefore we have provided two reports from IMR and Veritas, identifying where the most vulnerable fish stocks, seabirds, corals and sea mammals are. Based on this – WWF herby proposes five permanent petroleum free zones:

**(1) Lofoten** is unique as this is the spawning area for both cod and herring. Large seabird colonies are located at the islands of Røst and Værøy and the continental shelf holds the world's largest cold water coral reef. The total stock of Norwegian killer whales spend the winter and breed in the Vestfjord.

**(2) Vesteraalen** has corals, seabird colonies and is an important spawning area for haddock and herring. Fish eggs and larvae drift pass Vesteraalen from Lofoten on their way out to sea and it is an important feeding area for sperm whales in the summer.

**(3) LoppHAVet and the Tromsoefloe** has great seabird colonies and most of the fish larva from Lofoten and Vesteraalen is concentrated on the Tromsoeflak parts of the year.

**(4) Nordkapp and the coast of Finnmark** has important bird colonies, is wintering areas for rare birds and spawning area for capelin, the key species in the Barents Sea ecosystem



**(5) Bear Island, The Polar Front and the Ice Edge** is very productive areas important for the rest of the sea's ecosystem. The ice edge is where the plankton blooms and the area provides food for seabirds, polar cod, whales and seals. Bear Island holds enormous seabird colonies.

# Petroleum-free zones in the Barents Sea

This report presents WWF's proposal for permanent petroleum-free areas in the Lofoten-Barents Sea area. The report describes why we need such areas and which natural resources must be protected. WWF proposes exactly where these petroleum-free areas should be established.

WWF's proposal for permanent petroleum-free areas builds on two reports drawn up for WWF by the Marine Research Institute and Det Norske Veritas (DNV) in the spring of 2005. These reports can be found as appendixes to this report and can be downloaded from WWF's internet site: [www.panda.org/arctic/barents](http://www.panda.org/arctic/barents)

These reports only focus on the vulnerability to oil spills and looks at no other possible effects from petroleum exploration. All analysis and suggestions presuppose zero discharges from all stages of petroleum operations that could affect the marine environment.

## The Barents Sea's unique natural resources

The Barents Sea is one of the world's most productive and least polluted sea areas. It is still possible to achieve a sustainable management here, ensuring the ecosystem and its living marine resources for future generations. With sensible management of renewable resources and offensive measures to keep the level of pollution low, the Barents Sea will still be a source of long term income and new values to society. From a global perspective, the Barents Sea stands out as one of the world's most important eco-regions because of its special qualities as a highly productive arctic environment, and the fact that it has natural resources of international value as well a variety of wildlife and habitats.

Norwegian spring-spawning herring are among the world's largest fish stocks and spend its first year in the Barents Sea, before migrating into the Norwegian Sea. The world's last, large population of cod spawn around Lofoten and nurse and grow up in the Barents Sea. Mainland Europe's largest sea bird nesting cliff is on Røst, with over 400 000 nesting pairs of puffins. The world's largest cold-water coral reef, the Røst Reef, was discovered outside Lofoten in 2002. The total Norwegian population of killer whales are born and spend the winter in the Vestfjord, inside the Lofoten islands. Capelin lives out all stages of its life in the Barents Sea, and is a key species providing food for other species of fish, marine mammals and seabirds. The Barents Sea also is home to one of Norway's most endangered animals – the bowhead whale. It can be observed from time to time, a species assumed extinct for a long time in our seas. More information on the Barents Sea's natural resources can be found in WWF's report from 2003: The Barents Sea Ecoregion – A Biodiversity Assessment.

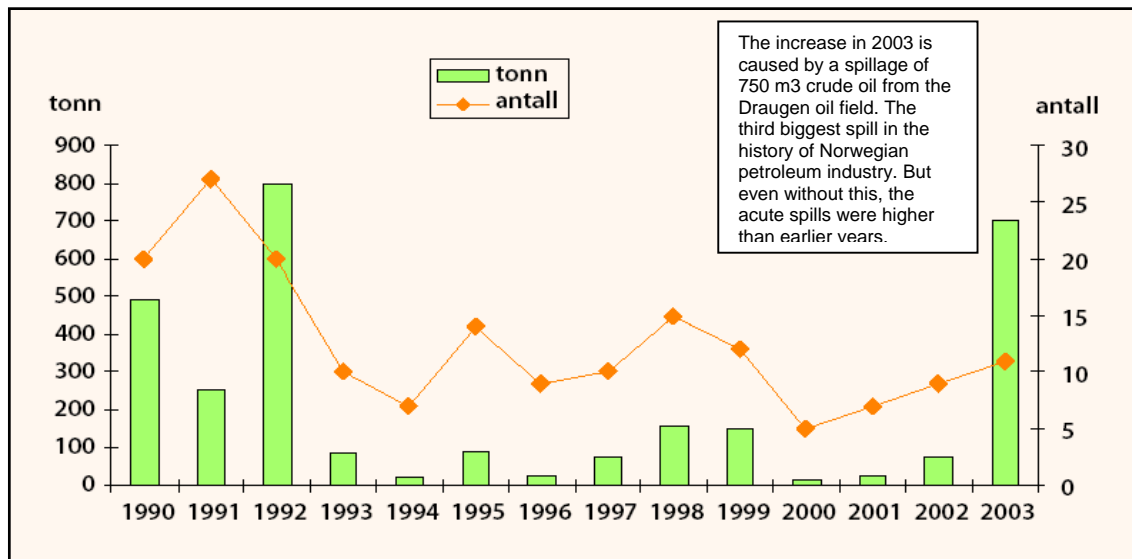
### The Barents Sea has:

- The world's last, large population of cod. Over half of the cod on the world market comes from this area
- 150 other species of fish, such as red fish, catfish, haddock, halibut and lumpsucker.
- Several hundred coral reefs, amongst them the world's largest cold-water coral reef
- Enormous colonies of seabirds, over 40 species and 20 million birds
- 17 species of whale and dolphin, 6 species of seal
- Otters, walrus and polar bear
- Several thousand square kilometres of kelp and a large number of sponges.

# There is always a risk of oil spills

Both the volume and number of oil spills are increasing in Norwegian waters. This relates to both total oil spills and to oil spill per produced amount of oil and gas.

According to Norwegian official statistics ([www.miljostatus.no](http://www.miljostatus.no)), the volume of oil released in acute oil spills from offshore petroleum operations in the period 1987 – 2004 is 4 652 tons in total. The number of oil spills in this period is 2 510. Most of the oil spills are relatively small, but can still cause significant environmental harm if they occur in the "wrong place". For example, between 10 and 20 000 polar guillemot died after a small oil spill from a ship in the Varangerfjord in Finnmark in 1979.



The above chart shows the number of spills over one ton and the annual volume of spillage in the period 1990 to 2004 (from OED's "Facts 2005 The Norwegian petroleum industry").

Lately, there have been a series of incidents that nearly lead to accidents, which, with small margins, could have caused large scale environmental damage:

- **Jotun A:** A burst gas pipe, August 04. Limited damage, but with the potential for a much more serious situation.
- **Snorre A:** Underground gas blow out, November 04. "On Snorre A, almost all stages of the operation failed. It is rare that we see so many things go wrong at the same time." (Executive Director Magne Ognedal, Petroleumstilsynet)
- **Ocean Vanguard:** December 04. The mobile drilling rig lost two of eight anchor chains, tore off the main riser and left a damaged exhaust valve on the seabed. This could have developed into a long-term oil blowout.

The semi-submersible drilling rig "Eirik Raude" has been used by Hydro and Statoil for test drilling in the Barents Sea during spring 2005. Eni plans to use the same rig for outstep drilling on the Goliath field near the coast of Finnmark in the autumn of 2005.

Eirik Raude is often referred to as "the world's most environmentally friendly drilling rig", and has the latest technology on board to prevent spilling oil into the sea. However, so far three illegal spills have occurred from the rig:

- On 8 February 2005, a leak occurred under Hydro's drilling in the Obelix well. A total of 6 cubic metres of BOP liquid ran out into the sea. Luckily, this liquid is classified as being in the green category, and there is only a small potential of environmental damage.



- On 16 February 2005, there was another accidental spill, which consisted of water-based drilling liquid. 160 kilos of it was material in the yellow category, having a potential for environmental damage.
- On 12 April 2005, a hydraulic tube sprang a leak on the "Eirik Raude" drilling rig. It leaked approximately 1600 litres of hydraulic oil into the sea.

After Statoil's accidental oil spill from the "Eirik Raude" drilling rig on 12 April, Executive Director Magne Ognedal from the Petroleum Directorate expressed that the percentage of errors in the oil industry is so high that he is concerned for the overall safety in oil operations in Northern waters.

The director of the Norwegian Pollution Agency (SFT), Håvard Holm, expressed the following in a press release on 13 April *"We consider this incident to be extremely serious. The prerequisite for oil drilling in the Barents Sea is that there should be no discharge of environmentally dangerous materials. This is the third accidental spill from the "Eirik Raude" rig. We are extremely uncertain as to whether the oil companies are able to carry out drilling in the Barents Sea as they have promised they will."*

These discharges show very clearly that even the world's best petroleum technology cannot ensure that acute discharges and accidental oil spills will not occur. Even if the probability of a large oil spill is small, the petroleum industry will always inherently imply a danger of oil spillage. By establishing petroleum-free zones, it will be possible to prevent accidents and discharges happening in the "wrong places".

## **Environmental impacts from petroleum industry**

Oil and gas exploration, being searching or extraction, both lead to large-scale emissions to air, water and seabed. Also the operations in the field, pipelines, transport and refinement of oil and gas lead to emissions. When fields are closed down, the disposal of apparatus and equipment will contribute to new emissions and waste problems. The oil and gas industry infrastructure affects large areas of the sea, the seabed and land.

### **Animal life on the seabed has changed**

The extension of oil and gas operations, with a large number of devices in the sea and emissions of large amounts of cuttings, has changed the composition of marine wildlife on the seabed across large areas. It will take a long time before the “old” pollution is broken down. In the meantime there are new emissions that affect the bed sediments. This happens even if the drilling liquids permitted today represent a smaller danger to the environment and cause less damage to marine life than what was the case previously.

Seismic surveys can damage organisms in the nearby area and scare off fish and sea mammals. The emissions from well drilling and from production can be significant. It is also often necessary to carry out a considerable amount of work on the seabed, such as planning, trench blasting and rock dumping in order to prepare the seabed for setting up platforms, seabed apparatus and pipes. After production has ceased it is often necessary to remove the apparatus, and this can lead to new disturbances on the seabed, for example, spreading oil, toxics and sludge from previous emissions.

### **Consequences for the North Sea**

Operations in the North Sea have been partly regarded as unproblematic, as the area was significantly polluted beforehand by emissions from many European countries. This means, however, that the total amount of pollution now is appearing, or might already have exceeded nature’s critical levels. The oil and gas industry is only one of many sources of pollution in the North Sea, and all discharges, regardless of size, contribute towards the overall effect on the ecosystems. However, it is difficult to prove the effects of such a chronic effect, as there are few approved methods for monitoring these effects on the seas.

### **Greater consequences in unaffected areas**

As oil operations move out into deep water, further north and closer to the coast, they also enter more fragile areas. The knowledge we have about the ecosystems in deep water and in the far north is not adequate. The organisms in these areas are often extremely vulnerable to changes in the environment.

Furthermore, the natural breakdown of pollution in deep water and in northern areas is very slow, due to low temperatures and lack of sunlight throughout large periods of the year. When the oil and gas industry goes into such areas, much stricter demands must be made for it to be “cautious” and not emit environmentally dangerous effluents. For the areas from Lofoten and northwards, the Norwegian Government has set a prerequisite for absolutely no physical discharges from drilling and produced water.

Source: The Ministry of the Environment ([www.miljostatus.no](http://www.miljostatus.no))

# Consequences for nature and society in the case of oil spillage in the most vulnerable areas

There are several factors that imply that oil spillage in the Barents Sea will have greater consequences than in more temperate waters. Extra ordinary light conditions, large seasonal variations, currents and bed conditions mean that access to food and production are very concentrated in time and space. An individual oil spill can therefore have significant consequences for whole populations and year groups. The ecosystem in the Barents Sea is also characterised by large natural variations in the sizes of populations. Resources that are already at low levels due to natural variations can be very hard hit by an oil spill.

The average wave height is over 2.5 meters more than 50 per cent of the time. The contingency plan for combating oil pollution is ineffective against such high waves and in the wintertime when it is mostly dark. The breakdown of oil is slow in cold waters. Oil slicks will be able to drift and cause lasting damage over long distances. Oil which reaches land can remain in sediments and release toxics to the environment for many decades. Most toxics are stored in fatty tissue in animals and are concentrated upwards in the food chain. Alarming concentrations of toxics have been recorded in polar bears and seabirds in the Barents Sea.

## **New reports from the Norwegian Institute of Marine Research (IMR) and Det Norske Veritas, DNV.**

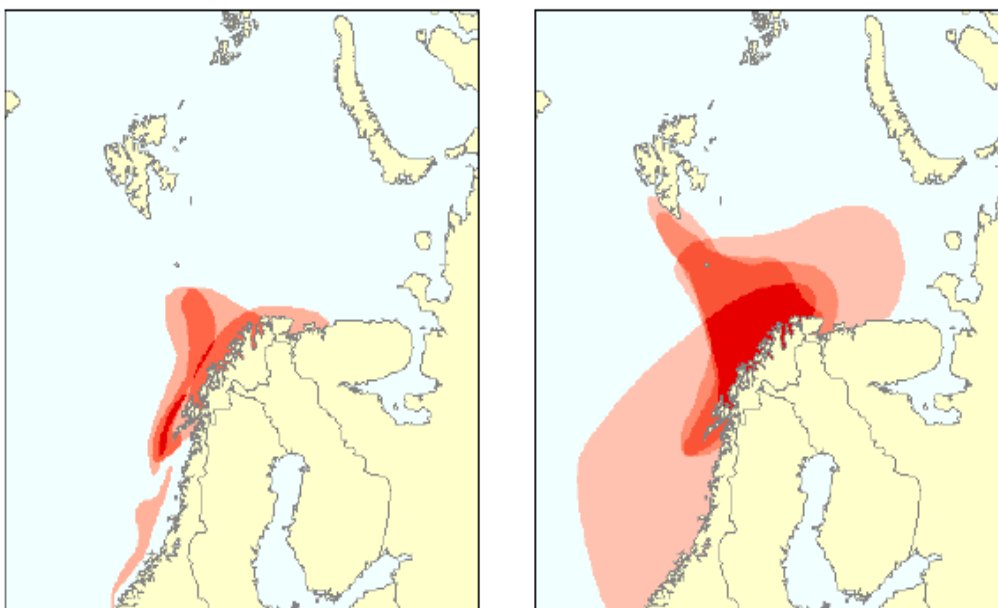
As an assignment from WWF, the Norwegian Institute of Marine Research has written the report "Valuable areas for cod, haddock, herring and capelin in the Lofoten-Barents Sea area (February 2005). The report shows valuable areas for fish stocks in the Barents Sea at different phases of development, including the egg and larval stages in which the fish is at its most vulnerable to oil pollution.

Det Norske Veritas (DNV) has drawn up the report entitled "Vulnerable areas in the Barents Sea (April 2005) for WWF. The report from DNV describes different natural resources' vulnerability to oil pollution and includes the data from the report written by the Institute of Marine Research. The most important results from these reports will be presented in the following. The report can also be downloaded from [www.panda.org/arctic/barents](http://www.panda.org/arctic/barents)

## **Fish and oil: extremely vulnerable areas**

Fish is especially vulnerable to oil and other chemicals at the egg and larval stages. When oil breaks down on the surface of the water, organic connections are created which can become mixed in with the water masses. Experiments have shown that these chemicals are extremely toxic for fish eggs and larvae. At this stage the fish drift in large concentrations with the ocean currents and this, in addition to the inability to move on their own, makes the fish eggs and larvae the most vulnerable to exposure to oil in the waters. Calculations show that as much as 20-30 % of a year group of cod can be killed if a large oil spill coincides with this period.

The charts from the Institute of Marine Research show where haddock, capelin, herring and cod spawn and where the eggs and larvae drift in large concentrations. This represents the areas which are the most vulnerable to oil spillage.

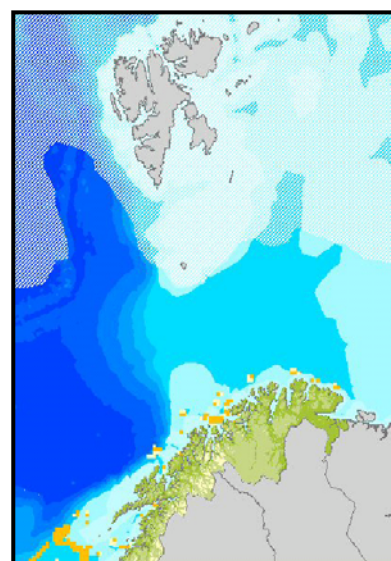


**Vulnerable areas for fish.** Charts from the Institute of Marine Research show the important fish stocks in the Barents Sea. These are the most valuable areas for cod, haddock, herring and capelin in the Lofoten-Barents Sea area. The figure is a composite picture of egg and spawning areas (left) and the larvae areas (right) for the four species together. The degree of red reflects the overlap between several species; i.e. light red shows little overlap, while deep red shows a great degree of overlap.

### **The seabed communities and oil: extremely vulnerable areas**

Oil from the surface can be transported down in the water column by waves and currents or discharges can come from pipelines and other underwater installations. What is common for sponges and corals is that they catch food by filtering out particles from the water that passes by. Therefore an oil spill can lead to the settlements on the seabed being poisoned, and in the worst case this can kill fish living of seabed organisms.

New coldwater coral reefs are constantly being discovered along the Norwegian coast, and some of these cover large areas. As a rule, coral reefs have a large diversity of species that are affected by physical disturbances, such as when underwater installations are set up. The same applies to areas of sponges, but their significance and locations have not yet been sufficiently investigated. There are a hundreds of corals from Lofoten and north and eastwards up to and including Finnmark.



Vulnerable areas for corals.  
(DNV 2005)

The map drawn up by DNV shows important incidences of coral reefs that can be affected by oil spills.

### Seabirds and oil: extremely vulnerable areas

The Barents Sea has one of the world's highest concentrations of seabirds. It has been calculated that this ocean area is home to approximately 20 million individuals in the summer time. Many of the populations are of great national and international significance, and the sea is therefore an important region for birds in a global context.

Seabirds are especially exposed in the event of an oil spill, because they take their food from the sea and can easily come into contact with oil spillage. Guillemot, Puffins, Shag, Great Cormorants, Black Guillemot and Eider duck are among the seabirds which are most exposed. Relatively small amounts of oil in a bird's plumage can have fatal consequences as it makes the feathers stick together so that the bird loses the ability to insulate itself against the cold and it literally freezes to death. Birds will try to clean their feathers with their beaks and in this way they will ingest oil and die of poisoning. After the Prestige accident off the coast of Spain in the autumn of 2002 it has been estimated that approximately 300.000 seabirds died, chiefly Guillemot, Puffins and razor-billed Auk

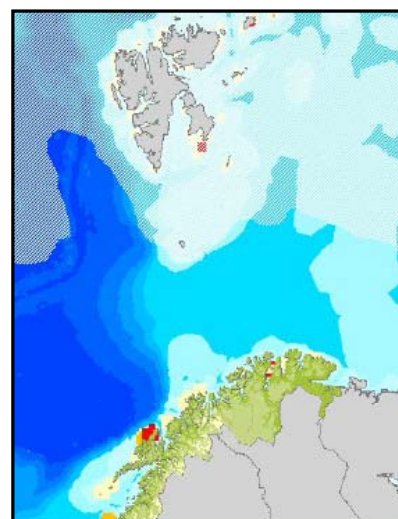


Vulnerable areas for seabirds.  
(DNV 2005)

The chart drawn up by DNV shows the areas where an oil spill will do the most damage to seabirds.

### Marine mammals and oil: extremely vulnerable areas

The northern seas are important areas for several species of marine mammals. White-nosed dolphins, Atlantic white sided dolphins, Killer whales, Porpoise, Narwhal, Beluga whale, Sperm whales, Beaked whales, Blue whales, Fin whale, Sei whales, Minke whales, Humpback whales, the very rare Bowhead (Greenland) whales, Walrus, Ringed seal, Bearded seal, Harp seal, Harbour seal and Hooded seal can all be found in the Barents Sea. Killer whales, fin whales, humpback whales and minke whales migrate northwards and in to the Barents Sea in the summer to feed on the large shoals of zooplankton and fish, but in the autumn they move southwards to temperate breeding and calving areas. Others may remain in the Barents Sea all year round, such as the beluga whale, the narwhal and the bowhead whale. The same applies for dolphin and porpoise whales and for harp seal, grey seals and harbour seal in the southern region of the Barents Sea.



Vulnerable areas for marine mammals (DNV 2005)

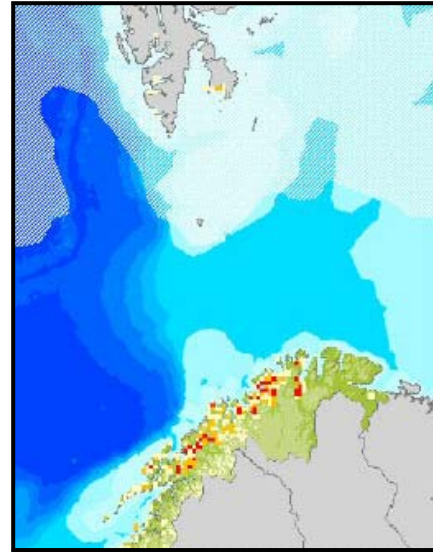
An oil spill can lead to the loss of important calving areas for marine mammals, and in the same way as for seabirds, mammals will be able to ingest oil and die of poisoning or will be injured so that they are not able to reproduce. Clean-up operations after an oil spill will also be able to affect seals if this occurs in the shedding period.

The map drawn up by DNV shows the areas where an oil spill will do the most damage to marine mammals.

### **The coastal zone and oil: extremely vulnerable areas**

The coastline is the meeting point between the sea and the land, and is characterised by a number of physical factors, such as salinity, temperature, tides, wave energy, glacial striation, substrata and topography – which in turn creates conditions for a diversity of species which live side by side in whole, complex communities with a high degree of biodiversity. Here, the level of biological production is very high, and coastal zones can suffer great damage due to oil spillage.

Experience from accidental oil spills shows that the damage to the coastal environment can vary in scope and duration: from almost total decimation of communities to marginal, non-fatal effects on an individual level. The chart, drawn up by DNV, shows the areas where oil spills will do the most damage to the coastal zones.



Vulnerable areas in the coastal zone (DNV 2005)



### **The fishing industry and oil: extremely vulnerable areas**

Fishing and aquaculture provide direct employment for over 50,000 people in Norway. After large oil spills in other countries, we have witnessed how an environmental disaster eventually affects people and the local communities.

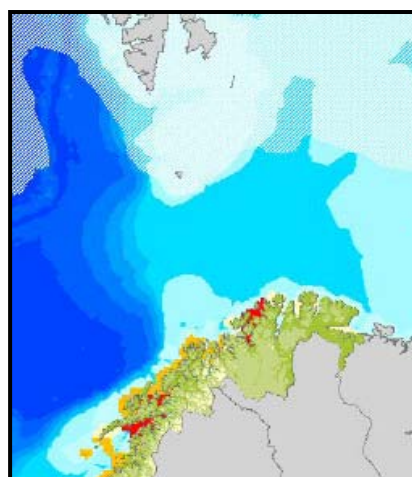
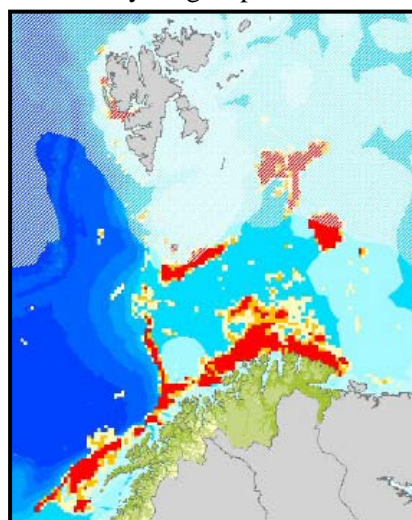
In the wake of the Prestige disaster, the fishing and aquaculture businesses in Galicia were affected in several ways. Firstly, because all fishing in the area was prohibited and there was a ban on the sale of seafood products in the period straight after the accident. In addition to this came the market-related effect that seafood from Galicia was considered to be polluted. The fisheries were closed down for 4 months after the disaster, and the turnover of seafood from the area was drastically reduced. Approximately 22,000 families were affected, chiefly people who were connected in one way or another to fishing or aquaculture. Approximately 20,000 people receive or have received financial compensation for loss of income. The financial consequences of the Prestige disaster are estimated to be over 5 billion Euros. The prices of seafood from the area have fallen dramatically, and today there is almost no trade in shellfish from the area. After the Braer disaster, off the coast of Shetland, two year groups of farmed fish were destroyed and the last restrictions on the fishing industry were only lifted in 2000, 7 years after the disaster.

The Barents Sea is already associated with radioactivity, sunken submarines and pollutions in some markets. It will probably not take a big disaster there to reinforce the opinion that the Barents Sea is not clean.

There is extensive fishing from both Norwegian and foreign vessels in large areas of this region. The main activities are cod fishing, prawn fishing, herring, capelin, pollock and haddock fishing. There is also fishing activity for ling, tusk, halibut, red fish, wolffish, king crab. Just under 10,000 professional fishermen are registered in Northern Norway and each professional fisherman creates between 2 and 3 jobs on land.

Salmon farming is currently one of the most important regional industries in many coastal areas. Salmon farming has become more and more significant in the Barents region, especially over the last 15 years. More knowledge about fish farming in general and the development of production technology in particular have made it possible to use farming locations which are more exposed than previously, and which have little or no traditional infrastructure.

An oil spill affecting fishing resources or associated business activity will doubtlessly bring more serious consequences for the whole area of the country. The charts drawn up by DNV show the areas where an oil spill would do the greatest damage to the fishing activity and fish farming operations.



Important and vulnerable areas for fishing (above) and aquacultural activities (below) in the Barents Sea. (DNV 2005)

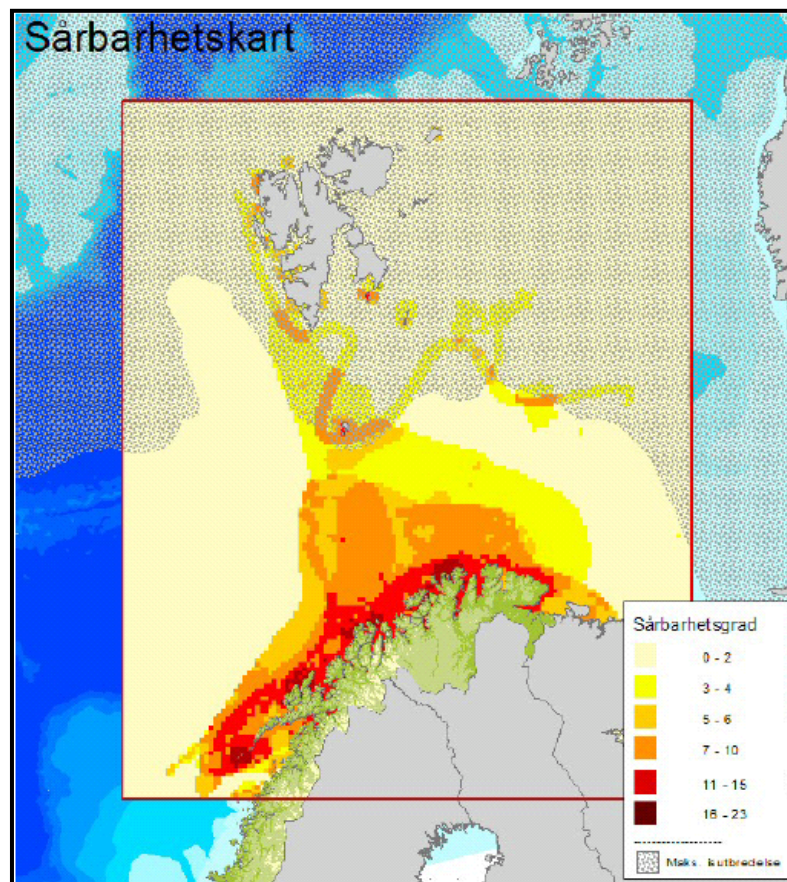
### Total vulnerability: the most vulnerable areas with regard to petroleum exploration

Based on the vulnerability analyses of natural resources and industries, DNV has drawn up a chart that shows all the areas that are the most vulnerable to petroleum exploration.

The most vulnerable areas on the map are those who are important for more than just one resource group. DNV has also used the following grading system when drawing up the overall map:

- Corals have been graded at level 1 as they are the least vulnerable in the case of an oil spill. Fisheries and aquaculture have also been given the same grade, as this is a loss that can, to a certain extent, be compensated for financially if an accident were to happen.
- Seabirds and marine mammals have been graded at level 2 as they are natural resources that cannot be replaced if they are lost. Both seabirds and especially seals can be very vulnerable in the case of an oil spill.
- Important fish stocks have been graded at level 3. Firstly, several of the populations are extremely vulnerable in the case of oil spillage as large numbers of eggs and larvae are to be found in high concentrations in a relatively small area. Secondly, several of the species of fish in the Barents Sea are the most important sources of food for other fish populations, seabirds and marine mammals, and if a large proportion of a population is affected, the effects will move up the food chain and the ecosystem. Thirdly, the fish stocks are of direct financial significance for Norway and especially for those who run related industries in that part of the country.

It is important to emphasise that the map is based on the most up-to-date data currently available. New knowledge, for example about where seabirds winter, or better mapping of the seabed, might show that individual areas could be assessed as even more vulnerable.



The areas which are most vulnerable to oil pollution in the Lofoten-Barents Sea area. (DNV 2005)



# WWF proposes five petroleum-free zones

There is no doubt that the consequences of an oil spill in the most vulnerable areas of the Barents Sea can be disastrous, not only for the natural resources here, but also for the fishing and aquaculture industries and for the northern part of Norway as a whole.

Neither is there any doubt that petroleum exploration will always be associated with a risk of oil spills. Regardless of how efficient the oil industry becomes, it will never be able to provide any guarantee against accidents – a fact clearly borne out by the numerous accidental spills on the Norwegian continental shelf.

The vulnerability analyses presented in this report show that where an oil spill occurs plays a large role. The risk for the environment from petroleum operations is a product of the probability that an accident will occur and the consequences of this accident for the environment. The most effective way of reducing the risk to the environment from petroleum exploration is to avoid activity in the areas where the consequences of an oil spill can be the most serious.

Some areas are so valuable for the ecosystem and for the local communities in and around the Barents Sea that we must be able to guarantee their future. Petroleum-free zones are the only way we can guarantee, as far as possible, against oil spills in an area, and this is therefore the safest way of protecting these areas against the inherent risks related to petroleum exploration.

Based on the reports from IMR and DNV, WWF proposes that five permanent petroleum-free areas are established in the Lofoten-Barents Sea. These are as follows: Lofoten, Vesterålen, the Tromsø Floe, the North Cape and the inner coast of Finnmark and Bear Island / the Polar Front as well as all areas that are covered in ice for the whole or parts of the year.

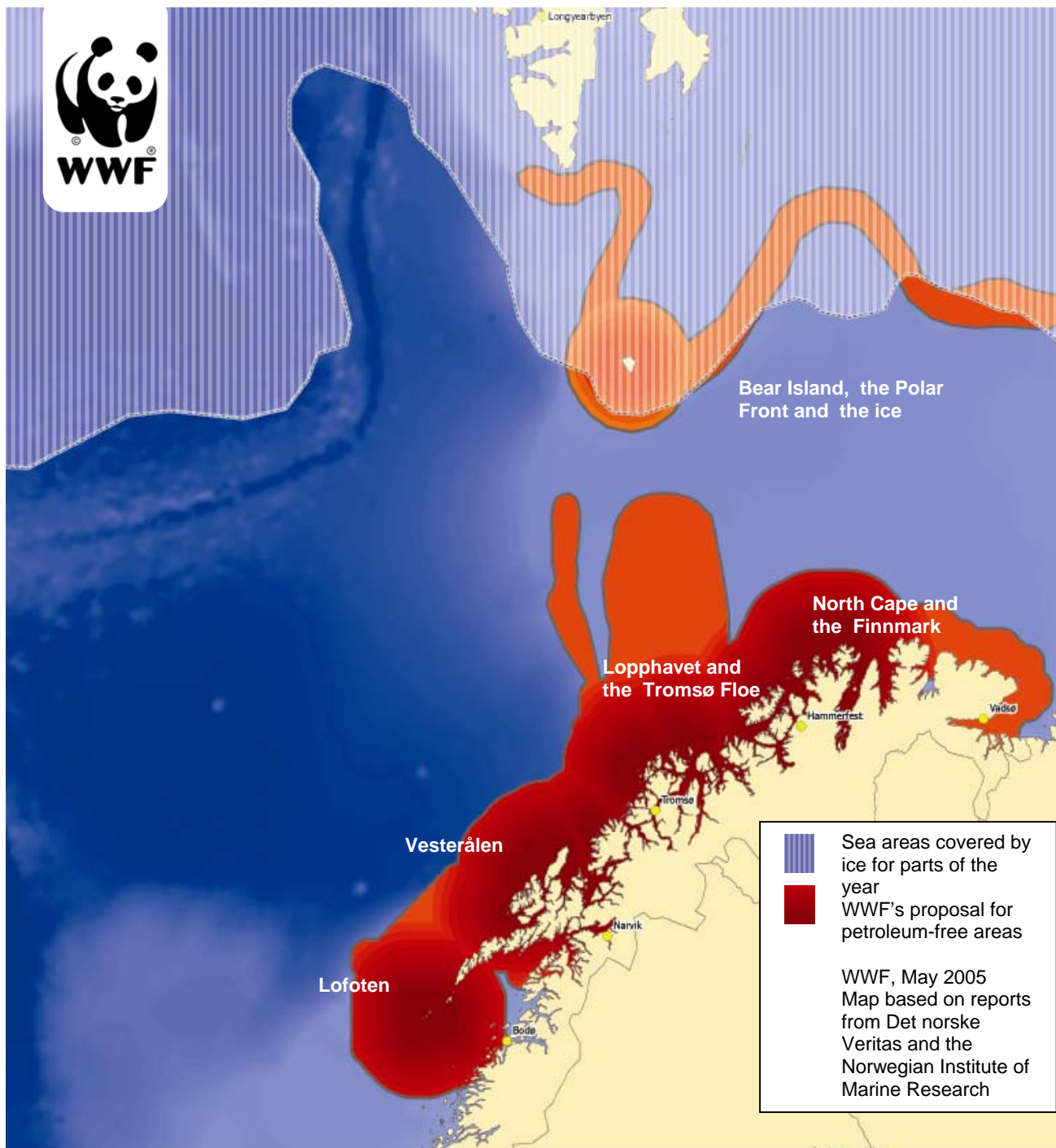
The methods used to conclude on these areas are as follows:

- A) Those areas which are decidedly most vulnerable in the DNV report, i.e. areas with a vulnerability value greater than 16, are selected. A buffer zone has been created around these areas that corresponds to the distance it will take an oil spill to drift in two days (approx. 70 km). This is based on the oil drift calculations in the Assessment of whole year petroleum exploration in the Lofoten-Barents Sea area (ULB), and is done to provide a minimum response time if emergency oil pollution services become necessary, and to ensure the safety of the areas around the largest colonies of seabirds. The proposal for petroleum-free zones covers the areas of sea that fall within the buffer zones.
- B) We have also chosen to include the areas with especially high concentrations of fish eggs and larvae (based on the report from the IMR). Because fish eggs and larvae are considered to be more vulnerable to oil in the water column than to oil on the surface, a buffer zone corresponding to 12 hours' drifting time (approx. 20 km) is added. The proposal for petroleum-free zones covers the areas of sea that fall within the buffer zones.

## **Definition of a petroleum-free area**

An area permanently closed for any type of petroleum operations, this means both exploration and extraction, based on the fact that the area has especially vulnerable natural resources.

The map on the next page shows WWF's proposal for petroleum-free zones.



Proposal for permanent petroleum-free zones in the Barents Sea. Areas covered with ice for parts of the year are also included in the proposed zones. The map has been drawn up by WWF Norway and is based on vulnerability analyses from Det Norske Veritas (April 2005) and mapping of fish resources from the Norwegian Institute of Marine Research (March 2005).

# Natural resources in the proposed petroleum-free zones

A short description of the natural resources in the five proposed zones is given below. More details and maps can be found in appendix III. A detailed description of the Barents Sea's natural resources can be found in the WWF report "The Barents Sea Ecoregion – A Biodiversity Assessment".

## Lofoten

Lofoten is an area in a class of its own, as it is a spawning area for both cod and herring, as well as the fact that large and important colonies of seabirds are to be found on Røst, Værøy and Lofotodden. The Vestfjord is also a winter and calving area for the total Norwegian population of killer whales. On the continental shelf and along the edge of the continental shelf outside Lofoten, there are also large areas covered with coral reefs. The world's largest coldwater coral reef is outside Røst. On the outer edge of Lofoten there are unique sandy beaches. White-tailed eagles, eider ducks, many types of auk, as well as European shag and great cormorants nest in the area.



Killer whale photo: WWF-Sverige

Cormorant photo: © WWF Frode Johansen

Wolffish on a coral reef © WWF Erling Svendsen

Cod photo: Norwegian Institute of Marine Research - Thomas de Lange Wenneck

## Vesterålen

Vesterålen is an important spawning area for haddock and herring, and is an area where sperm whales congregate at Bleiksdjupet. Fish eggs and larvae from Lofoten drift through Vesterålen on their way to the Barents Sea. During migration periods there are a numerous ducks and wading birds resting in this area, and here are also nesting areas for Northern gannet. There are large colonies of kittiwake and shag as well as a large population of harbour seals. There are coral reefs on the continental shelf and along the edge of the shelf. The coral reefs at Steinavær have been called Norway's most beautiful corals.



Sperm whale photo: © WWF-Canon / Hal WHITEHEAD

Herring photo: © WWF Arctic program

Harbour seal photo: Tom Schandy

### **Lopphavet and the Tromsø floe**

On the Tromsø floe, large whirlpools in the ocean currents ensure that herring, cod and haddock eggs and larvae are collected together in large concentrations for parts of the year. Also, the edge of the continental shelf is an important spawning area for haddock. Large communities of sponges can be found, as well as coral reefs on the Tromsø floe and in Lopphavet. On the islands and along the coast there are important nesting areas for eider duck, black guillemot, herring gull, great black-backed gull, lesser black-backed gull, white-tailed Eagle, puffin and auk.



Cod fry photo: Norwegian Institute of Marine Research

Red fish on coral reef photo: Norwegian Institute of Marine Research

White tailed eagle photo: WWF Thomas Thommassen

Puffin photo: © WWF-Canon / Michèle DÉPRAZ

### **The North Cape and the coast of Finnmark**

The coast of Finnmark is a spawning area for capelin, the most important species of fish in the Barents Sea's ecosystem, as it provides food for several other species. The cliffs on the coast of Finnmark have important nesting colonies for seabirds, such as guillemot and puffin. The largest remaining guillemot colony on mainland Norway can be found on Hjelmsøya. Along the coast and in the fjords, there are also important wetland areas that are resting and nesting areas for ducks, geese and wading birds. Varangerfjord is the most important wintering area for the extremely rare Steller's duck.



Eider duck photo: © WWF-Canon / Mauri RAUTKARI

Great eider photo: John Stenersen

Capelin photo: [www.fiskeri.no](http://www.fiskeri.no)



### **Bear Island and the Polar Front, and all areas covered by ice for parts of the year**

The ice edge is a highly productive area and is very important for the whole of the rest of the Barents Sea's ecosystem. Polar cod spawn under the ice, and use the ice edge as a feeding area throughout the summer. Beluga whale, bowhead whale and narwhal live mainly around the ice edge. Several thousand auks from Svalbard and Bear Island moult at the ice edge. Tens of thousands of little auk have been observed at the ice edge in the winter. Bear Island has one of the world's highest concentrations of nesting seabirds. Whales, seals and polar bears can be found in the areas covered with ice.



Polar cod photo: Norwegian Institute of Marine Research - Thomas de Lange Wenneck

Walrus photo: © WWF-Canon / Wim VAN PASSEL

Ivory gull photo: © WWF-Canon / Peter PROKOSCH

Beluga whale photo: © WWF-Canada

# Scientists, environmental authorities, businesses, politicians and the Norwegian people all want petroleum-free zones

## **Marine scientists and environmental authorities recommend petroleum-free zones in the Barents Sea**

The Norwegian Institute for Marine Research, the Norwegian Polar Institute, the Norwegian Directorate for Nature Management and The Norwegian Pollution Agency (SFT), with their current level of knowledge about the Barents Sea, are all sceptical to year round petroleum exploration in the Barents Sea. All institutions indicate that there are extremely vulnerable areas and states that if the Barents Sea are opened to year round exploration, these areas must be avoided.

The view points of the scientific and environmental institutions came across during the consultation rounds with regard to the investigation into the consequences of the whole year's petroleum operations in the Lofoten-Barents Sea area (ULB).

Furthermore, SFT expressed the following in connection with the 17<sup>th</sup> round of concessions: *"SFT advises against blocks in Nordland VI and recommends petroleum-free zones"* The Norwegian Institute of Marine Research advised against all forms of off-shore petroleum operations in the area from Lofoten to the Tromsø Floe in its response to ULB during the consultation round.

## **The Norwegian Fishermen's organisations (Norges Fiskarlag og Norges Kystfiskarlag) are in favour of petroleum-free areas in the Barents Sea**

In the autumn of 2003, the Norwegian fishermen's organisation, Norges Fiskarlag, decided upon a common platform for the organisations view about oil activities in the Barents Sea. Norges Fiskarlaget does not oppose oil activities in principle, but has strict demands for zero discharges into the sea in new areas, that the activity must not hinder fishing activity and that it is necessary to reinforce the contingency plan for combating oil pollution. In addition to this, Norges Fiskarlaget states the following in its resolution:

*Certain areas are more vulnerable than others:*

- *No activity in Nordland VI, VII or Troms II*
- *Will adhere to scientific recommendations in other possible petroleum-free areas in the Barents Sea*

Another Norwegian fishermen's association, Norges Kystfiskarlag, states the following: *"Out of concern for the fisheries and fishing resources, Norges Kystfiskarlag is against further test drilling, and extension of operations in Nordland VI, Nordland VII and Troms II, as well as the areas close to the coast in the remaining areas"*.

## **Political parties that want petroleum-free areas in the Barents Sea**

The Labour Party, the Christian Democratic Party, the Socialist Left Party, the Liberal Party, and the Centre Party have all established in their party manifestoes that they wish to protect the most vulnerable areas against oil operations. The Socialist left party reject all petroleum operations in the Barents Sea. The other parties are in favour of the most vulnerable areas in the Barents Sea being established as petroleum-free zones.

In the its declaration from 2001, the Norwegian Government states that it will: "... – take petroleum-free fishing zones into consideration. This consideration will cover the areas from Lofoten northwards, including the Barents Sea".

### **The majority of the Norwegian population want petroleum-free zones in the Barents Sea**

In April 2005 Visendi AS carried out an opinion poll for WWF. The results show that WWF's initiative for establishing petroleum-free zones in the Barents Sea have a great deal of support from the Norwegian population – despite the fact that information on this alternative has been insufficient.

The question read: *"In Lofoten and the Barents Sea, there are great natural resources in the form of fish stocks, marine mammals, seabirds, coral reefs, etc. The area is attractive for oil exploration, tourism, research fishing and hunting. Petroleum exploration in Lofoten / the Barents Sea is a balance between taking care of biological diversity and increasing Norway's income. To what extent do you agree or disagree that some areas in the Barents Sea should be excepted from oil exploration?"*

1 – Completely disagree

2

3

4

5

6 – Completely agree

Don't know

The results show that a total of 60 per cent of the 1 182 people asked agreed that some areas of the Barents Sea must be protected against oil operations. Women are the most positive, with 70 per cent and men are split down the middle. With regard to age, young people agree most (69 per cent in the 14 – 24 age group), whilst those between 45 and 55 disagreed most (46 per cent).

With regard to politics, the survey shows that the Centre Party voters (80 per cent), the Liberal Party (78 per cent) and the Socialist Left Party (75 per cent) are the most positive and believe that some areas must be protected against oil drilling. It is noteworthy that over half of those who vote for the Labour Party (55,6 per cent) and almost half of the Conservative Party and the Progress Party's voters are positive towards petroleum-free areas (45 and 47 per cent respectively).

# How to establish petroleum-free zones?

There is no doubt that there is a scientifically proven basis for establishing permanent petroleum-free zones in the Lofoten-Barents Sea area. All environmental institutions recommend these zones. Petroleum-free zones also have broad political support (all parliamentary parties except for the Conservative Party and the Progress Party) and the majority of the population are in favour of these areas

The Government is currently drawing up the overall management plan for the Barents Sea. This looks at the cumulative environmental effects of petroleum operations, shipping, fishing and fish farming and the plan is expected to be presented to the Parliament in spring 2006. The plan will also propose definite management measures, and it has a mandate to propose definite petroleum-free zones.

The work on the management plan is co-ordinated by a steering committee. This committee has, in turn, established a working party to assess “Area assessments of vulnerable areas – conflicts of interests”. The report from this working party was presented in April 2005. This report emphasises the vulnerability of the natural resources in the same areas that WWF proposes to be established as permanent petroleum-free zones.

The overall management plan for the Barents Sea represents a very good opportunity for the politicians, in the Government and in Parliament, to establish permanent petroleum-free zones in the Barents Sea with a broad scientific basis, with a solid core of long-term considerations for natural resources and the continuation of industry.

WWF proposes that the opportunity to establish petroleum-free zones around especially vulnerable natural resources should be bound by law. A legal foundation will require a change or specific rewording of petroleum legislation or environmental legislation so that it is given an explicit authorization to establish permanent petroleum-free zones out of consideration for unique and vulnerable natural resources.



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Moe, K.A. & Brude, O.W. 2003, Strand – Miljøkomponenter i Littoralen, Forekomster og Fordeling i Området Lofoten-Barentshavet (*Beach – Environmental Components in the Coastline, Occurrences and Distribuion in the Lofoten – Barents Sea Area*).

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A nationwide representative selection of 1182 people (from 16 to 80 years of age) answered the electronic questionnaire.

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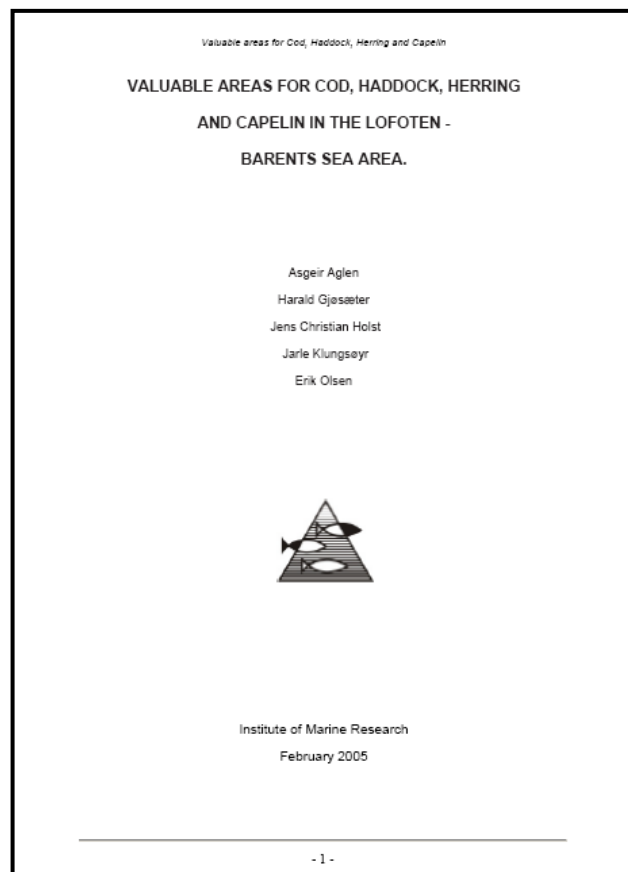
WWF 2003. The Barents Sea Ecoregion, A biodiversity Assessment  
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# Appendix I: The Norwegian Institute of Marine Research 2005 – Valuable areas

The Norwegian Institute for Marine Research 2005. Aglen, A., Gjøsæter, H., Holst, J.C., Klungsøyr, J. & Olsen, E. Valuable Areas for Cod, Haddock, Herring and Capelin in the Lofoten-Barents Sea Area. Report for WWF Norway.

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[http://www.panda.org/about\\_wwf/where\\_we\\_work/arctic/what\\_we\\_do/marine/barents/publications.cfm](http://www.panda.org/about_wwf/where_we_work/arctic/what_we_do/marine/barents/publications.cfm) (English Version)

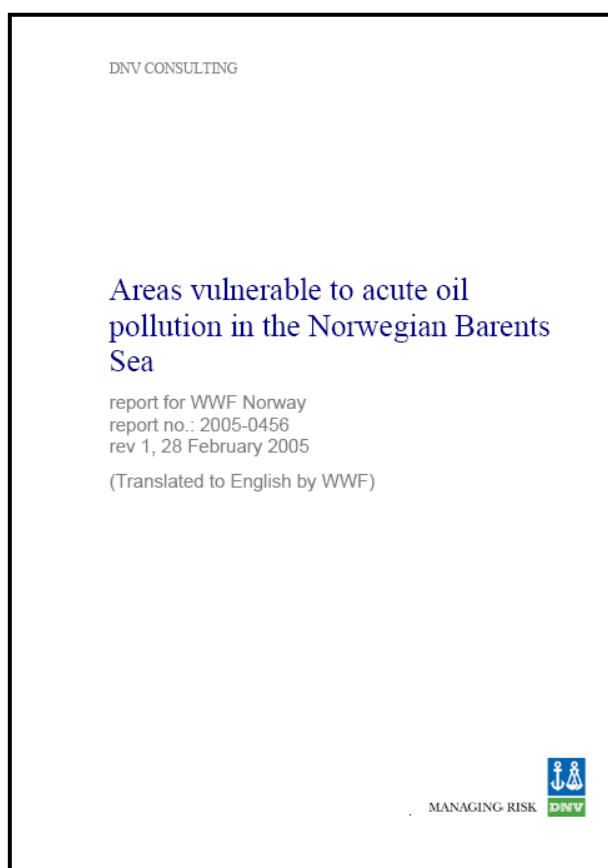


## Appendix II: Det Norske Veritas 2005, Vulnerability Analysis

DNV 2005. Vulnerable Areas in the Barents Sea. Det Norske Veritas. Report for WWF Norway.

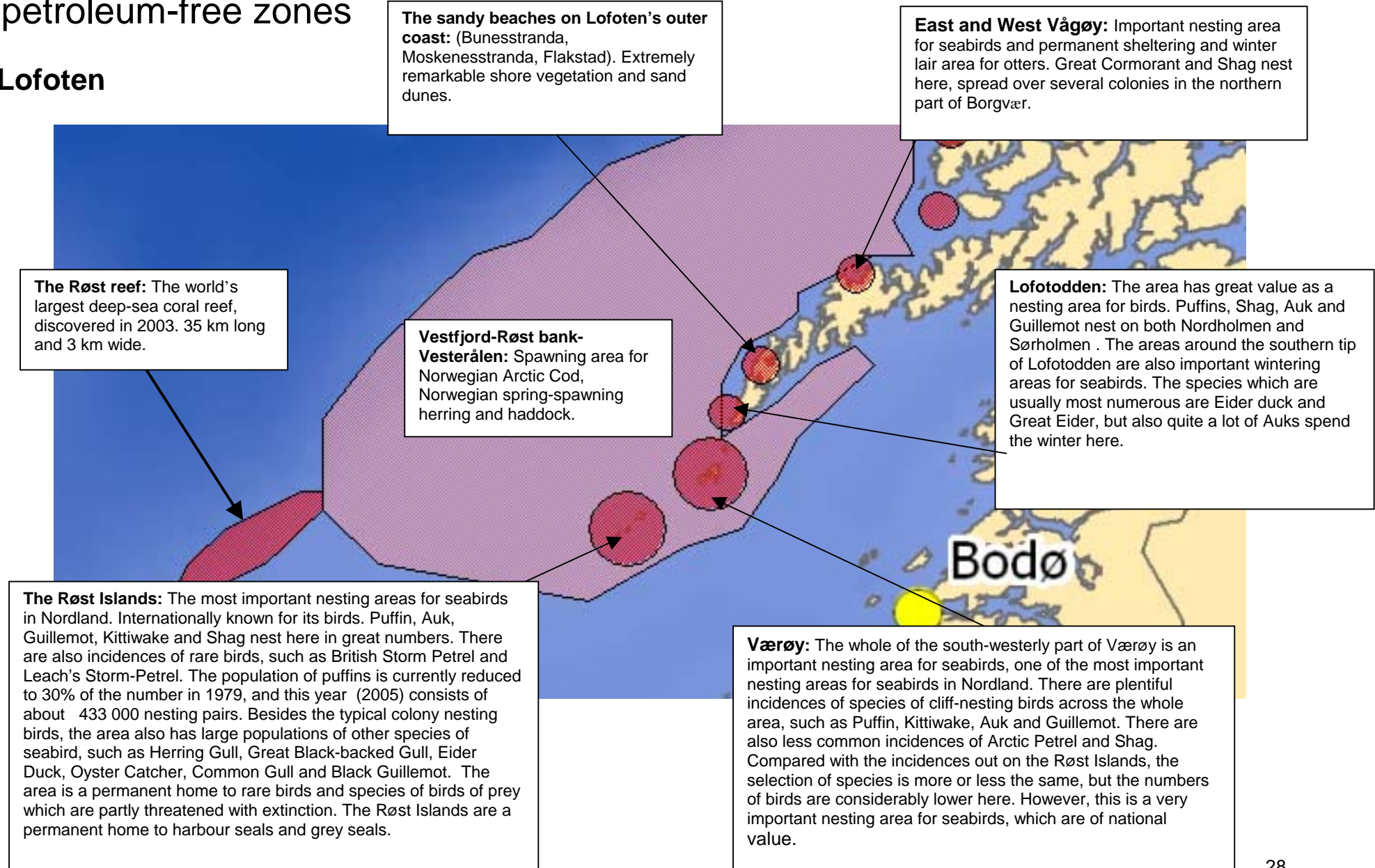
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# Appendix III: Description of the natural resources in the five proposed petroleum-free zones

## Lofoten



# Vesterålen

**Stø / Nyksund:** Important production area for seabirds and harbour seals. The greatest value with regard to birds is attached to the Kittiwake and Shag colonies. The population of Harbour Seal in the area is one of the largest we know of in the county. Corresponding populations are known only from Nordmela on Andøya and from the Røst Islands.

**Nykvåg:** Some of the most important nesting cliffs we have in Nordland, where all the typical cliff-nesting species are to be found. The nesting areas for Puffin and Guillemot are especially important. Significant value is also attached to the Kittiwake colonies, and the colony at Nykvåg is one of the largest Kittiwake colonies in the county..

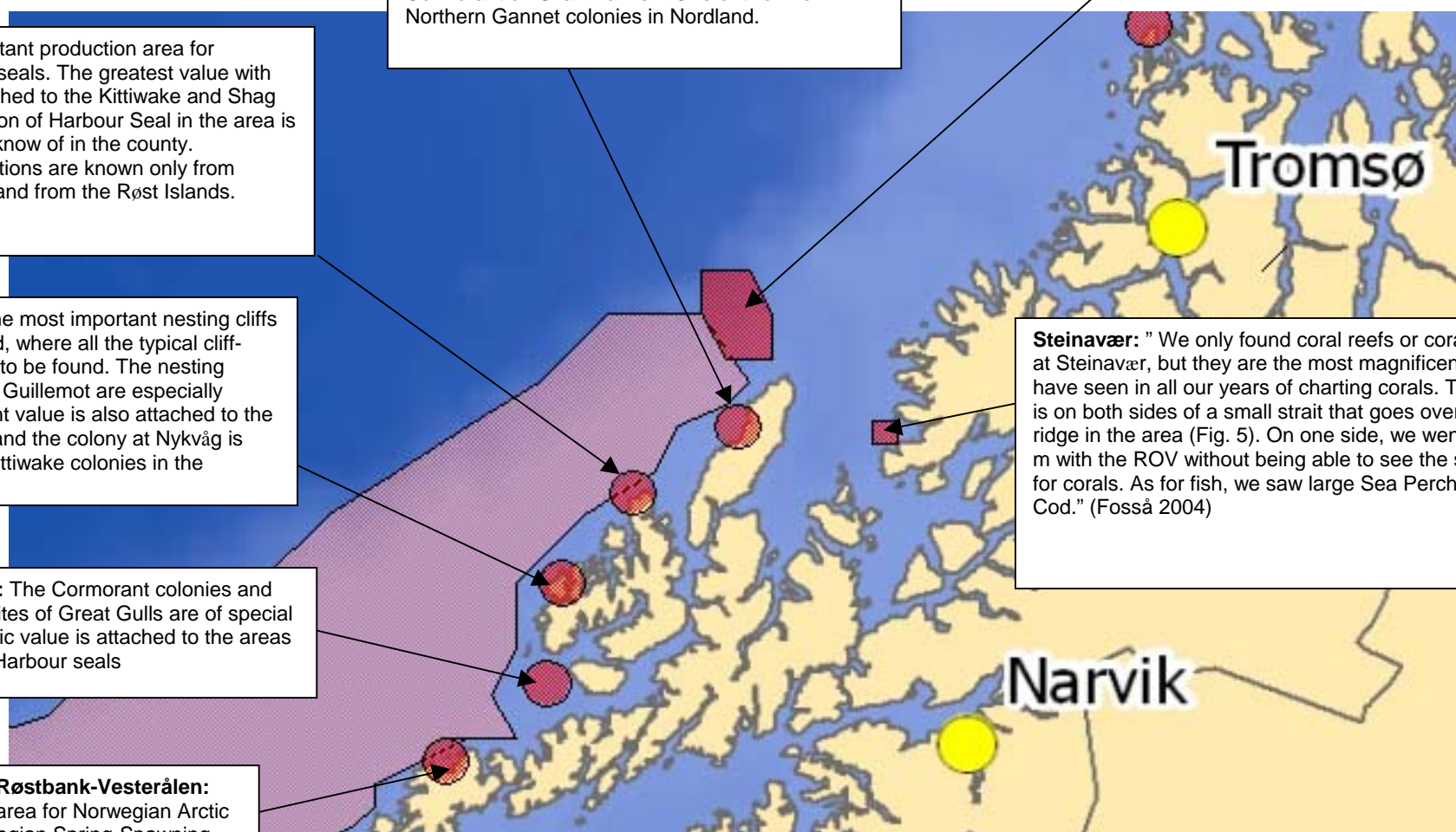
**Ulvøyvær (Hadsel):** The Cormorant colonies and significant nesting sites of Great Gulls are of special value. Great scientific value is attached to the areas large population of Harbour seals

**Vestfjord-Røstbank-Vesterålen:** Spawning area for Norwegian Arctic Cod, Norwegian Spring-Spawning herring and haddock.

**Skogvoll:** The islands and the shallow waters outside Stave, Skogvoll and Nordmela are of great ornithological value. Pink-footed Goose use these areas as a resting and feeding area while migrating to Svalbard. During the migration period, there are also a fair number of ducks and wading birds that rest in the area. There are nesting sites on the islands and islets for Northern Gannet and Great Cormorant on Skarvklakken. One of two known Northern Gannet colonies in Nordland.

**Bleiksdjupet:** Bleiksdjupet outside Andøya is an area where Sperm Whale congregate. The Sperm Whale feeds on the large numbers of octopus which are gathered here in Bleiksdjupet. It is assumed that the animals observed here are non-reproducing animals, for example young animals or very old males. There are coral reefs in the deep trench and on the shelf, but many have been destroyed up on the shelf.

**Steinavær:** " We only found coral reefs or coral areas at Steinavær, but they are the most magnificent we have seen in all our years of charting corals. The reef is on both sides of a small strait that goes over a ridge in the area (Fig. 5). On one side, we went 500 m with the ROV without being able to see the seabed for corals. As for fish, we saw large Sea Perch and Cod." (Fosså 2004)





# Lopphavet and the Tromsø Floe

**Hjelmsøya:** The most important guillemot colony on the mainland. The population is reduced to 5% of what it was in the mid 60s.

**Lille Kamøy:** Lille Kamøy has Norway's largest colony of Shag, approx. 2,400 pairs. Otherwise Kittiwake and Guillemot and possibly Puffin nest here. Eider duck, Black Guillemot, Herring Gull and Black-backed Gull also nest on the island.

**Lopphavet:** Proposed as an area for marine protection. Varied natural resources above and below the water. Coral reef on the slopes towards the deep channel west of Sørøya, in Sørøysund and in Stjernøysund. Important spawning area for Norwegian Arctic Cod. Lopphavet is a transition zone between southern and northern species in the Barents Sea, and is an important reference area for research.

**Loppa:** Varied nesting cliffs with plentiful incidences of auks.

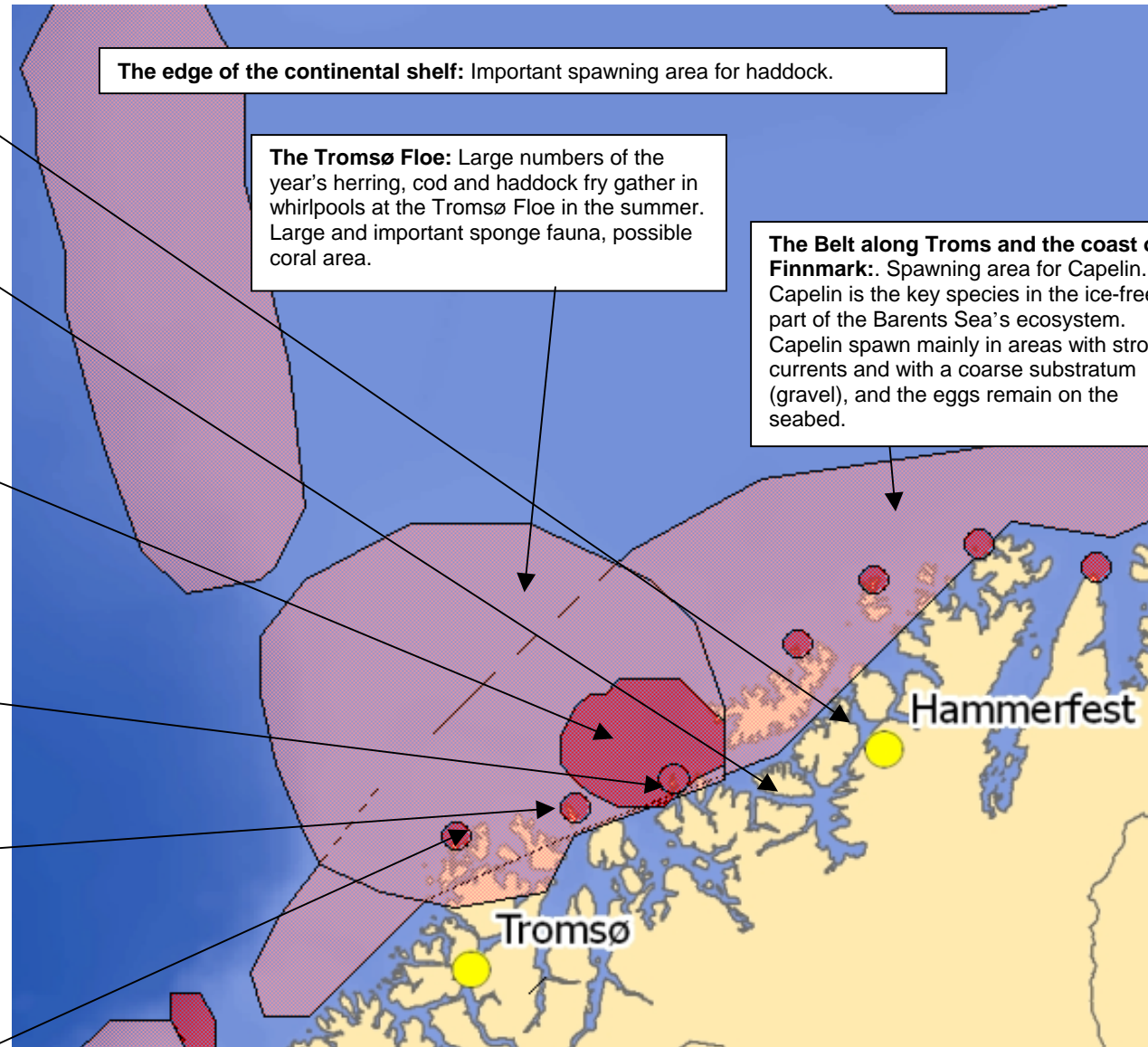
**North Fugløya:** One of Norway's largest and most important nesting cliffs. Has been called Norway's largest single colony of seabirds, but the numbers are old and uncertain (1967). The area is worthy of international protection, with both nesting White Tailed Eagle and Lesser Black-backed Gull.

**South Fugløya:** The most important nesting cliffs.

**The edge of the continental shelf:** Important spawning area for haddock.

**The Tromsø Floe:** Large numbers of the year's herring, cod and haddock fry gather in whirlpools at the Tromsø Floe in the summer. Large and important sponge fauna, possible coral area.

**The Belt along Troms and the coast of Finnmark:** Spawning area for Capelin. Capelin is the key species in the ice-free part of the Barents Sea's ecosystem. Capelin spawn mainly in areas with strong currents and with a coarse substratum (gravel), and the eggs remain on the seabed.



# The North Cape and the Coast of Finnmark

**Slettnes:** One of the most important areas for wading birds in Norway and Scandinavia. Important as a resting area for migrating birds and as a nesting area for waders, seagulls and ducks. Slettnes is one of the few coastal flatlands on the Finnmark coast which has not been built up and is defined as a wetland area worthy of international protection (RAMSAR area).

**Sværholtklubben:** Important nesting cliff and plant life. The reserve consists of an approx. 170 m high nesting cliff with sheer sides. The area houses one of the largest nesting colonies of Kittiwake in Finnmark.

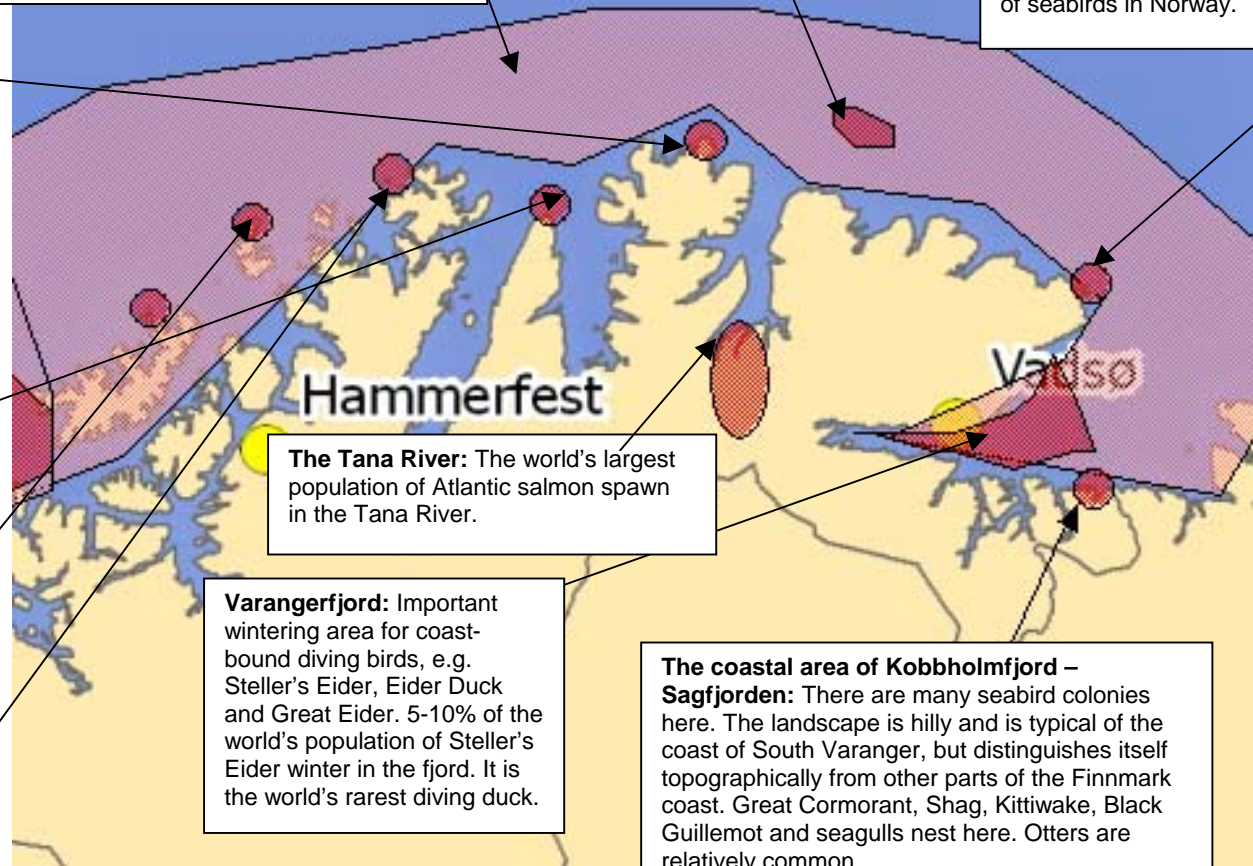
**Hjelmsøya:** The most important Guillemot colony on the mainland. The population is reduced to 5% of what it was in the mid 60s.

**Gjesværstappan:** A nature reserve covers the three islands of Storstappen, Kjerkestappen and Bukkstappen. Most of the seabirds nest on Storstappen. The colony of puffins is one of the largest in the county. Stappan is of great botanical interest.

**The belt along the Troms and Finnmark coast.** Spawning area for Capelin. Capelin is the key species in the ice-free part of the Barents Sea's ecosystem. Capelin spawn mainly in areas with strong currents and with a coarse substratum (gravel), and the eggs remain on the seabed.

**The shelf outside Kongsfjord**  
Reports of incidences of corals, not yet charted.

**Hornøya and Reinøya:** The easternmost of 14 protected seabird colonies along the Finnmark coast. Hornøya and Reinøya are nesting areas for many species of seabird and nature reserves has been selected as a reference area in a greater scientific study of the development of the population of seabirds in Norway.

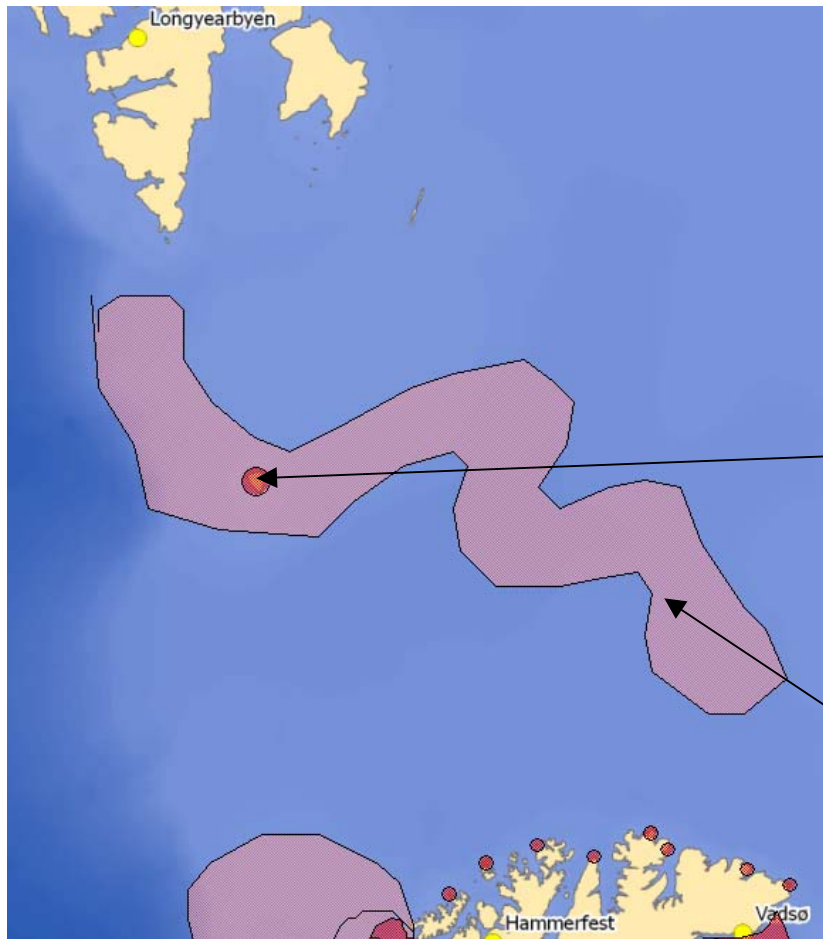


**The Tana River:** The world's largest population of Atlantic salmon spawn in the Tana River.

**Varangerfjord:** Important wintering area for coast-bound diving birds, e.g. Steller's Eider, Eider Duck and Great Eider. 5-10% of the world's population of Steller's Eider winter in the fjord. It is the world's rarest diving duck.

**The coastal area of Kobbholmfjord – Sagfjorden:** There are many seabird colonies here. The landscape is hilly and is typical of the coast of South Varanger, but distinguishes itself topographically from other parts of the Finnmark coast. Great Cormorant, Shag, Kittiwake, Black Guillemot and seagulls nest here. Otters are relatively common.

## Bear Island, the Polar Front and the ice edge



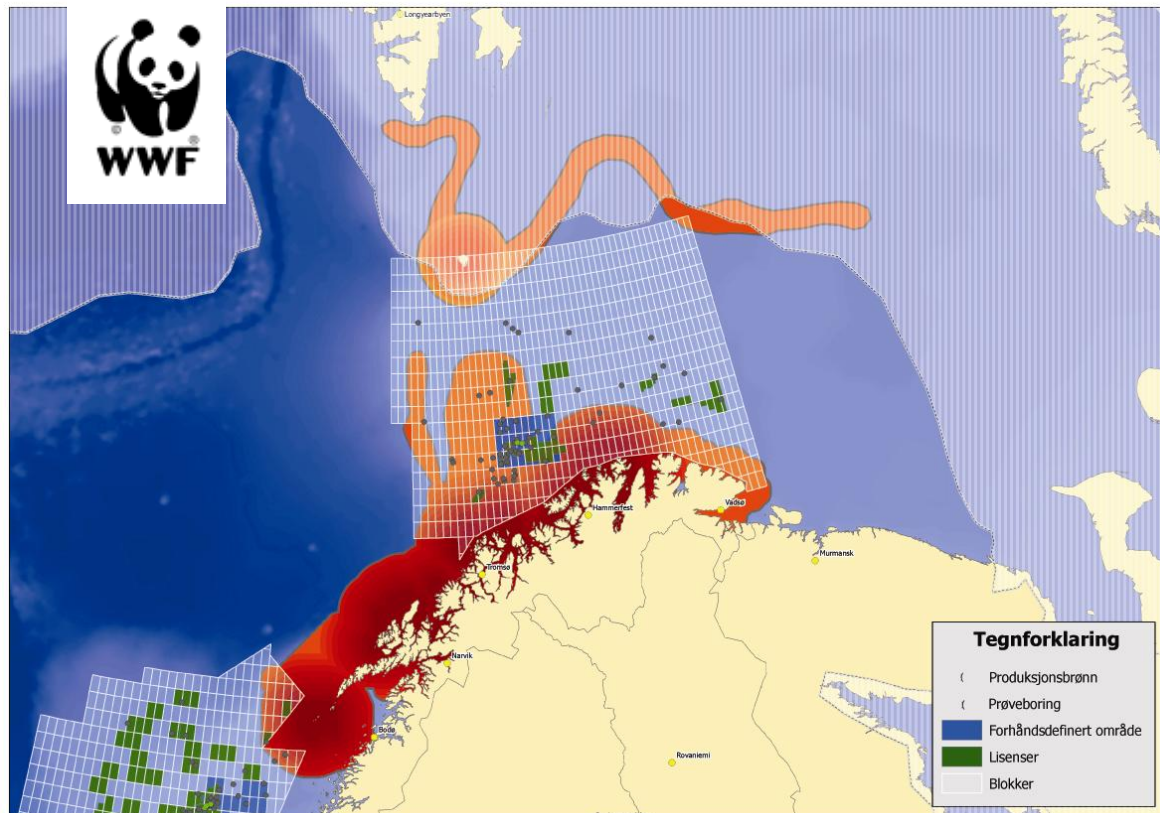
**The ice edge:** Extension varies greatly according to the season and from year to year and is not drawn in on the map. At times, the ice edge can overlap somewhat with the polar front in wintertime. The ice edge is the most productive part of the arctic ecosystem. The edge creates a green belt from April to August. In constant movement. High concentrations of zooplankton (Copepod, *Calanus*), fish, marine mammals and seabirds. Polar Cod spawn under the ice and use the ice edge as a feeding area throughout the summer. Beluga Whales, Bowhead Whales and Narwhal live mostly around the ice edge. Several thousand auks from Svalbard and Bear Island moult at the ice edge. Tens of thousands of Little Auk have been observed in flocks around the ice edge in the winter.

**Bear Island:** Some of Europe's largest nesting colonies of seabirds, especially Polar Guillemot and Guillemot are here. Also, there are important seabed settlements in shallow waters around Bear Island, e.g. well-developed kelp forests.

**The Polar Front:** Warmer water from the Atlantic and cold and less salty water from the Arctic meet in this area. These currents create a very productive belt where spring surges in the amount of plankton occur in May. Enormous amounts of krill and copepod are produced here and are transported out as food to large parts of the Barents Sea. The largest shrimping fields in the Barents Sea are to be found along the Polar Front. The area is also very important for seabirds, fish and marine mammals. There is an especially rich seabed settlement due to the food that sinks to the bottom of the sea.

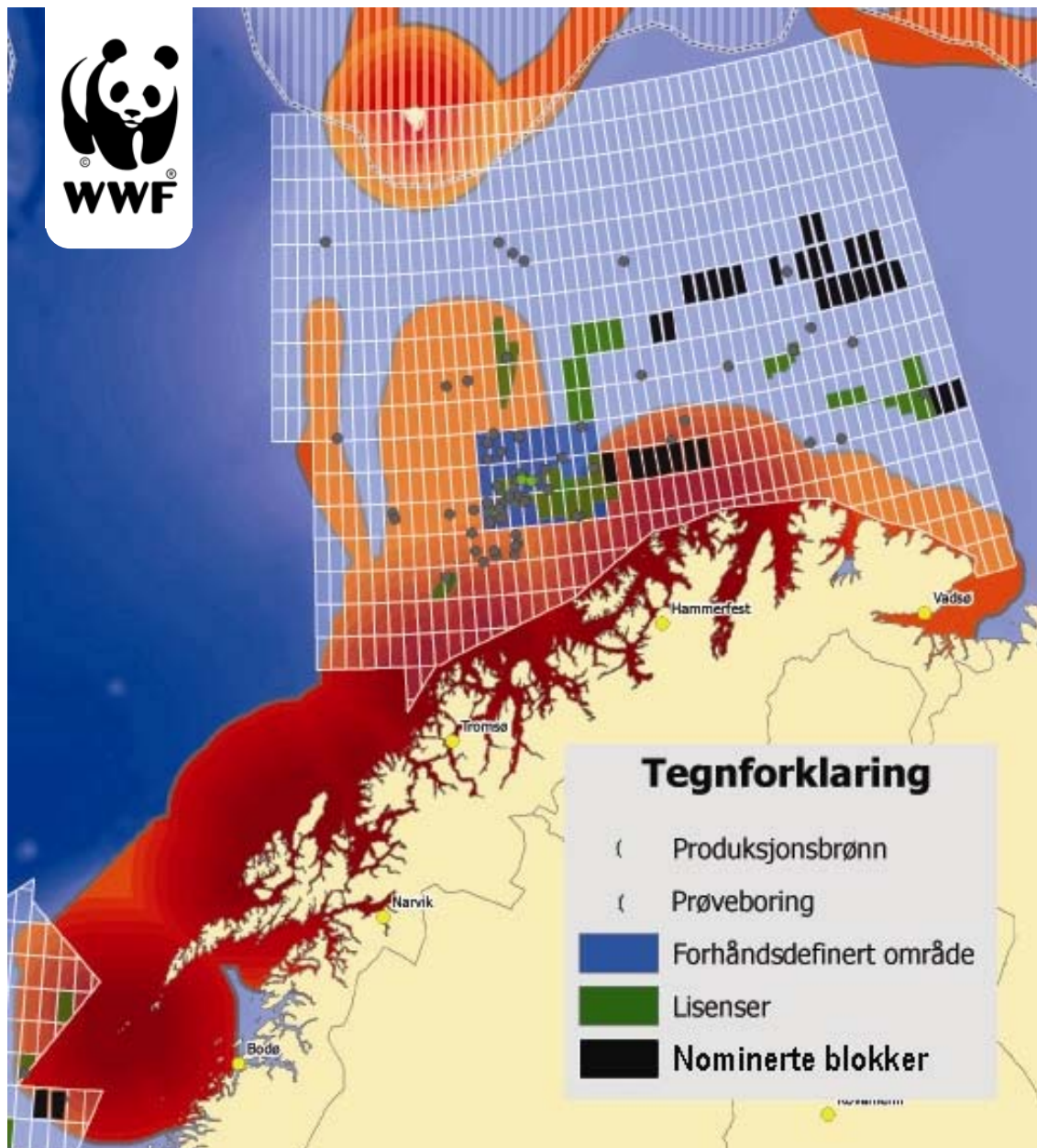


## Appendix IV: Map showing petroleum activity in the Norwegian area of the Barents Sea



WWF's proposal for petroleum-free zones in the Barents Sea, including a shelf chart from the Norwegian Petroleum Directorate.

## Appendix V: Map showing petroleum blocks nominated in the 19th round of concessions.



Blocks nominated in the 19th licencing round. Blue is previously defined blocks, green is existing licences and black is nominated.

## **WWF-Norway publications**

### **2005**

Tørke i norsk vannbistand – en gjennomgang av norsk vannrelatert utviklingssamarbeid i perioden 1999 til 2003

On the run – escaped farmed fish in Norwegian waters

Fattigdom, miljø og utvikling – intensjoner og praksis i norsk miljøbistand

Norske EØS-milliarder: til bærekraft – eller naturrasering? Om Norges og sivilsamfunnets rolle i EØS ordningene 2004 til 2009

The EEA funds for new member states: Cohesion, transparency, sustainability?

Petroleumsfrie områder i Barentshavet – det er nå det gjelder!

Petroleum free zones in the Barents Sea

### **2004**

WWFs verneplan – for å bevare Norges fantastiske skognatur

The Barents Sea cod – The last of the large cod stocks

Vanndirektivet – et miljøløft med startvansker

Gaupejakta – forvaltningen bommer igjen

Biologisk mangfold – det levende grunnlaget for fattigdomsbekjempelse

Biologisk mangfold i norsk bilateralt utviklingssamarbeid – teori og praksis

### **2003**

Defensiv norsk miljøpolitikk – i og utenfor EØS: om kjemikalier og biologisk mangfold

The Barents Sea Ecoregion – A biodiversity assessment

En framtid for villreinen – en framtid for fjellet

Food for Thought: the Use of Marine Resources in fish Feed

Barentshavet – et hav av muligheter.... og trusler

Levende skoger - naturarv for framtida

Gaupa – færre og færre

### **2002**

Clean conscience consumption of seafood – Ecolabels and environmental management systems for fisheries and aquaculture

Miljømerker for sjømat - en oppsummering av miljømerker og miljøstyringssystemer for fiskerier- og havbruksprodukter

Particularly Sensitive Sea Areas (PSSA) i Barentshavet

EUs habitatdirektiv

Statsskog bygger "miljøhyttetun" som mangler miljøinnhold ved Lemonsjøen

### **2001**

The Status of Wild Atlantic Salmon: A River by River Assessment

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption



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