

Identifying particularly valuable and vulnerable areas: a key tool for the integrated management plans for the Barents Sea and Norwegian Sea.

AUTHOR: Erik Olsen

ABSTRACT:

In 2006 Norway implemented an integrated and ecosystem-based management plan for the Barents Sea, and is currently developing a similar plan for the Norwegian sea. Norway aims to have such plans for all sea areas under Norwegian jurisdiction. The main aim of IM in the Barents Sea and Norwegian Sea is to ensure a sustainable use of the ecosystem by balancing all human activities. A key tool to developing the area-based management frameworks have been the identification of particularly valuable (biologically) areas and evaluation of their vulnerability to human impacts. Biological value was determined in relation to importance to the biological production, biodiversity or as key habitats to threatened or vulnerable species. Seven particularly valuable areas were identified in the Barents Sea, while in the Norwegian Sea ten particularly valuable areas were identified. In the Barents Sea plan human usage of these areas is carefully managed to reduce impacts and risks – in the most vulnerable parts, in Lofoten – Vesterålen and along the coast, new petroleum activities are banned, shipping traffic has been moved off-shore using mandatory routing and traffic separation schemes, and a series of MPAs are planned along the coast. Similar area-based management frameworks area planned for the Norwegian sea, and will be presented to parliament in 2009.

KEYWORDS: Barents Sea, Norwegian Sea, value, vulnerability, area-based, integrated management, ecosystem-based-management

CONTACT AUTHOR: Erik Olsen, Institute of Marine Research, PO Box 1870 Nordnes, N-5817 Bergen, Norway. Phone: +47 55 23 86 06. Fax: +47 55 23 86 87. E-mail: eriko@imr.no

INTRODUCTION AND METHODS

Ecosystem-based management (EBM) has for the last decade been advocated as the best solution to achieve a sustainable use of marine resources. At the Johannesburg summit in 2002 (Nations 2002) an agreement was reached to aim towards EBM of all living marine resources by 2010. Norway, as a signatory nation to the Johannesburg declaration has set a schedule for developing integrated management (IM) plans for all marine ecosystems within the Norwegian EEZ (Anon 2001; Anon 2005). The first of these was the integrated management plan for the Barents Sea which was passed by Stortinget (Parliament) in 2006 (Anon 2006). The Barents sea plan is currently being followed by the development of an IM plan for the Norwegian Sea and North Sea. The Norwegian Sea plan is aimed to be presented for Stortinget in 2009, while work on the North Sea plan started in 2008. Large-scale area-based management is at the core of all three management plans with the aim of a sustainable use and health of marine ecosystems under Norwegian jurisdiction.

Identification of ecologically valuable areas has been a central tool in the development of the Barents Sea (Olsen and von Quillfeldt 2003) and Norwegian Sea (Ottersen and Auran 2007) plans. Areas were identified using a set of criteria in an expert-based process evaluating the importance of the areas from an ecological perspective with importance to: 1) biodiversity and 2) biological production (eg. breeding or spawning grounds) (Olsen and von Quillfeldt 2003; Olsen, Gjørseter et al. 2007; Ottersen and Auran 2007).

Sensitivity of the identified ecological areas in relation to the human activities fishing, shipping, petroleum and external influences was analyzed in later steps of development of the Barents sea plan, and is currently (August 2008) being analyzed for the Norwegian sea. This sensitivity analysis was in turn used as a foundation for developing management framework for the petroleum activities in the Barents Sea for the period 2006 – 2010 when the Barents sea plan is due for revision. A similar approach is planned for the development of the Norwegian Sea plan.

RESULTS

Seven ecologically valuable areas were identified in the Barents sea (Anon 2006). These were the Lofoten – Vesterålen coastal area, Tromsøflaket bank area, Eggakanten edge of the continental shelf, a 50 km coastal zone from Troms to the border with Russia, a 50 km zone around Bear Island, the polar front and the iced edge (Figure 1).

Lofoten – Vesterålen

The area comprises major spawning grounds for northeast atlantic cod (*Gadus morhua*) and northeast arctic haddock (*Melanogrammus aeglefinus*) in addition to overwintering areas for norwegian spring spawning herring (*Clupea harrengus*) large sea-bird colonies, large local populations of grey- and harbor seals, killer whales, as well as seasonal populations of larger whales (minke, fin and sperm and others).

Tromsøflaket

This shallow bank area has a circulating currents patterns making it a large and important retention areas for fish egg and larvae spawned further south along the coast (eg. in Lofoten – Vesterålen). The area is also an important spawning area for haddock and has high densities of sponges

Eggakanten

The edge of the continental shelf is an important spawning habitat for redfish and other deep-water fish species. It is also an important feeding habitat for marine mammals and seabirds

Coastal zone

Important spawning habitat for capelin (*Mallotus villosus*) and coastal cod in addition to being an important feeding habitat for especially seabirds that have many large colonies along the coast.

Bear Island

Retention area for juvenile fish. Very rich near-shore bottom fauna and large seabird colonies.

Polar Front

Productive area where warm Atlantic and cold arctic water masses meet. Important feeding habitat for fish, seabirds and whales.

Ice edge

Productive area near the ice edge with a special fauna important as prey for fish, sea-birds, seals and whales

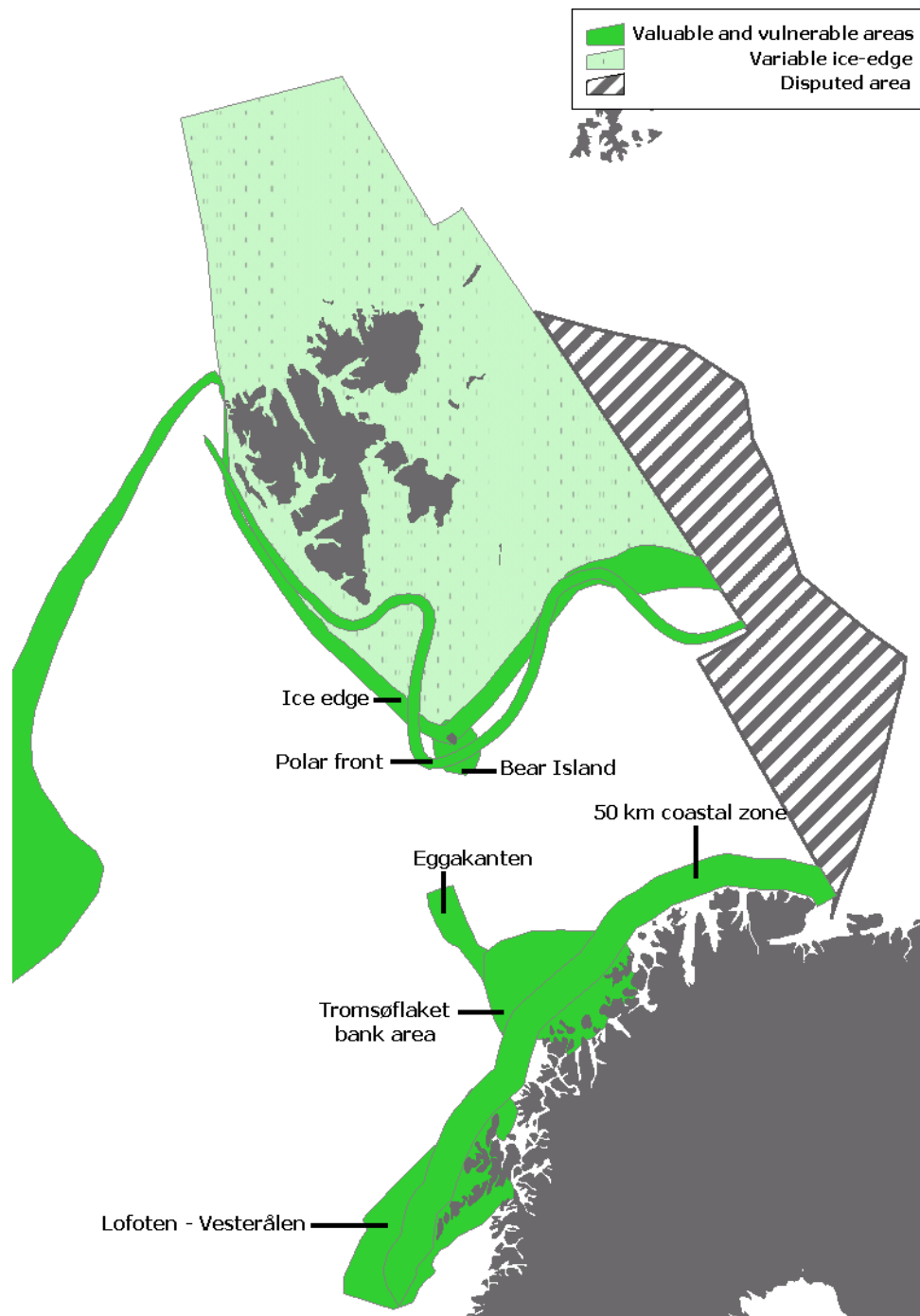


Figure 1 Particularly valuable areas in the Lofoten - Barents sea area identified through the development of the integrated management plan for the Lofoten - Barents Sea

In the Norwegian Sea ten ecologically valuable areas were identified (Ottersen and Auran 2007). These were the Møre bank area, Remman kelp forest, Froan and Sula archipelago and coral reef, Halten bank, Sklinna bank, Iverryggen coral reef, coastal zone, Eggakanten edge of the continental shelf, the Arctic front and the area around Jan Mayen island (Figure 2).

Møre

The largest and most important spawning grounds for Norwegian spring-spawning herring as well as important spawning grounds for cod and saithe (*Pollachus virens*). Dense kelp-forest near the coast.

Breeding colonies for seabirds. Important area for coastal seals and killer whales. Proposed marine protected area.

Remman

Dense and important kelp-forest. Proposed marine protected area.

Froan og Sula

Large deep-water coral reef. Sea-bird colonies. Habitat for harbor seals. Proposed marine protected area.

Halten bank

High-productive retention area is an important habitat for both fish egg and larvae in addition to larger fish. Important spawning habitat for Norwegian spring-spawning herring and saithe.

Sklinna bank

High-productive retention area is an important habitat for both fish egg and larvae in addition to larger fish. Important spawning habitat for Norwegian spring-spawning herring and saithe.

Iverryggen

Large deep-water coral reef. Proposed marine protected area.

Coastal zone

Wintering and feeding area for many fish species and spawning habitat for local stocks of fish (eg. cod and herring). Important area, especially during breeding for sea-birds. Pupping grounds for coastal seals. From Møre to Nordland there are important kelp-forests.

Eggakanten

Spawning habitat for redfish and greater argentine. Feeding habitat for many fish species as well as seabirds and whales.

Arctic front

Front area with strong currents and high primary production. Feeding habitat for large whales (blue-, fin-, minke- and bottlenose whales). Feeding habitat for seabirds.

Jan Mayen

There are current front systems around the island harboring high primary and secondary production. Large colonies of seabirds on the island use the surrounding waters for feeding. West-ice area around Jan Mayen is an important pupping ground for harp and hooded seals.

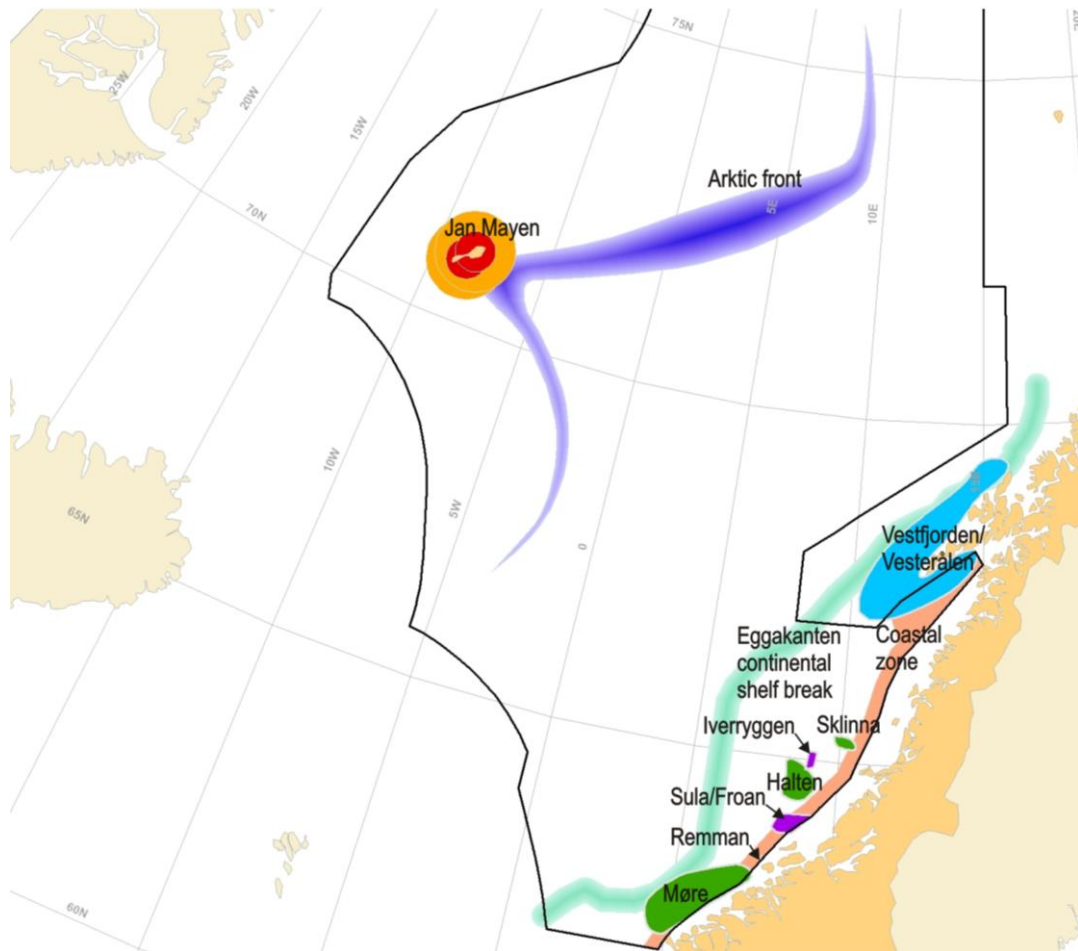


Figure 2 Valuable areas in the Norwegian Sea identified through the development of the integrated management plan for the Norwegian Sea.

DISCUSSION

The valuable areas in both the Barents sea and Norwegian sea were identified using a similar set of criteria and therefore for both ecosystems areas of high value are mostly associated with the reproductive phase of fish, birds or mammals. The reproductive and early juvenile phase is generally the most sensitive phase in the life-history of all animals – the time when negative external influence can have the greatest negative impact on the continued well-being of the population.

In the Barents sea plan effort is put on trying to preserve the value of these areas by setting up management frameworks for human activities. All three human sectors, fishing, shipping and petroleum were set different goals and/or concrete management frameworks were developed. For fishing effort is put on implementing sustainable management strategies for all stocks where ecological considerations of the impact of fisheries on other parts of the ecosystem is taken into account. Shipping was set under a new routing regime (approved by IMO) moving the larger vessels 30 nm offshore allowing for separation of south and north-going traffic thereby reducing the risk of collision and increasing reaction time in case of accidents. This routing scheme also moved shipping traffic out of the valuable areas. A designated area-based management framework was developed (see Figure 3) for petroleum activities were most of the valuable areas were banned for petroleum activities in the period 2006-2010 (Lofoten – Vesterålen, innermost part of the coastal zone, Eggakanten, Bear Island, the Polar front and the ice edge), while Tromsøflaket and the outermost

part of the coastal zone were afforded limited degrees of protection by banning new activities or imposing drilling restrictions from March – September. In the Barents sea the identification and specification of ecologically valuable areas had a direct impact on the management goals and area-based management frameworks of human activities.

The management plan for the Norwegian sea is still under development, but it is not unlikely that similar to the Barents sea the identified valuable areas will carry weight in the management goals and framework that will be developed. However, the Norwegian is not like the Barents sea an undeveloped oil region. There are nine oil/gas fields in production in this area, as compared to one under development in the Barents sea, and therefore the management framework to be developed for the Norwegian sea must take into account the already existing management regimes for the fields in operation.

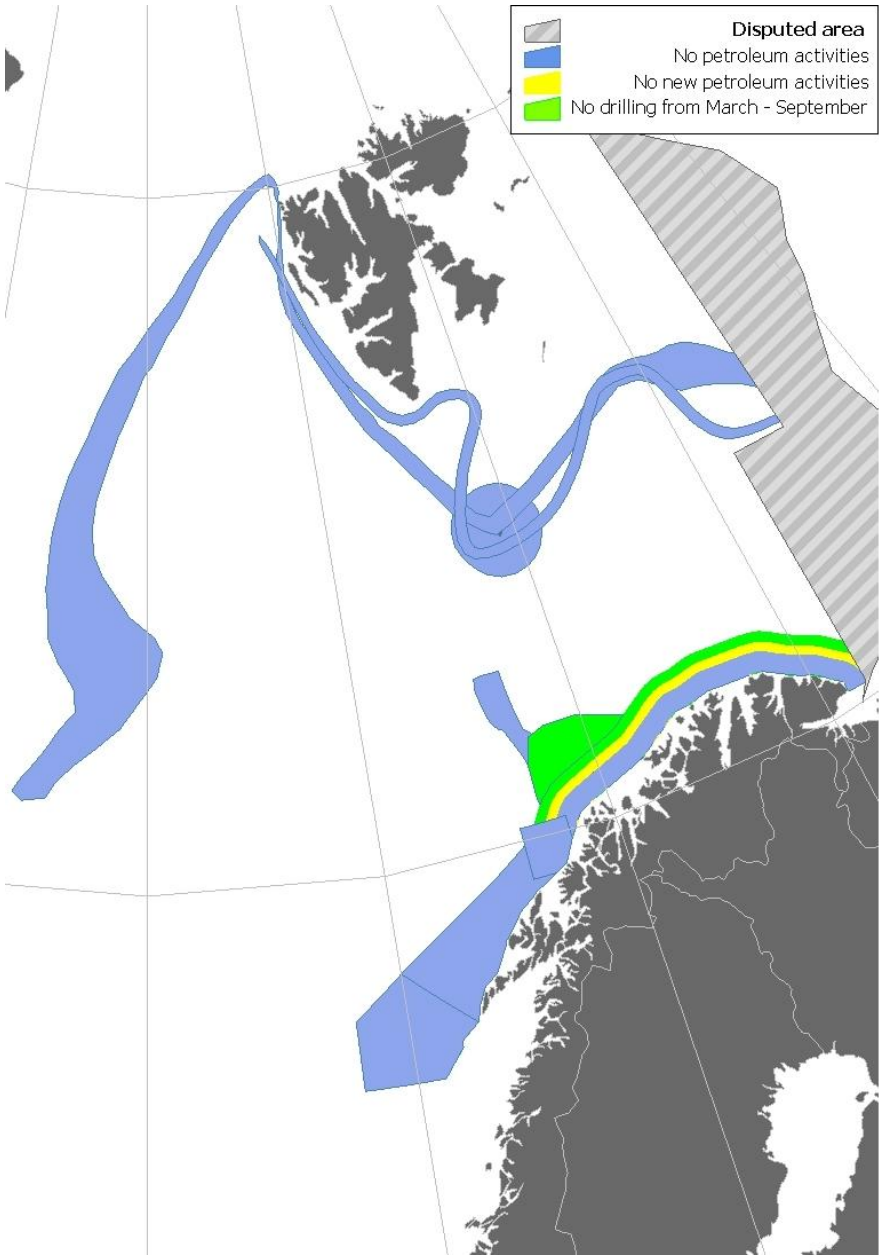


Figure 3 Area-based management framework for petroleum activities in the Barents Sea as designated in the integrated management plan for the Lofoten – Barents Sea area in 2006.

REFERENCES

- Anon (2001). Politisk grunnlag for en Samarbeidsregjering (Sem Erklæringen). Oslo: 52pp.
- Anon (2005). Plattform for regjeringssamarbeidet mellom Arbeiderpartiet, Sosialistisk Venstreparti og Senterpartiet 2005-09: 73.
- Anon (2006). St.meld.nr. 8 (2005-2006) Helhetlig forvaltning av det marine miljø i Barentshavet og havområdene utenfor Lofoten (forvaltningsplan). Oslo, Ministry of environment: 139pp.
- Nations, U. (2002). Plan of Implementation of the World Summit on sustainable Development (Johannesburg declaration). New York, United Nations: 62pp.
- Olsen, E., H. Gjøsæter, et al. (2007). "The Norwegian ecosystem-based management plan for the Barents Sea." ICES Journal of Marine Science.
- Olsen, E. and C. H. von Quillfeldt (2003). Identifisering av særlig verdifulle områder i Lofoten - Barentshavet. Bergen/Tromsø, Institute of Marine Research/Norwegian Polar Institute: 72.
- Ottersen, G. and J. A. Auran (2007). Helhetlig forvaltningsplan for Norskehavet: Arealrapport med miljø- og ressursbeskrivelse. Fisken og Havet, Havforskningsinstituttet. **6**: 165.