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Food for Thought

Lofoten – Vesterålen: for cod and cod fisheries, but not for oil?

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Over the last decade, the most controversial issue regarding the management of Norwegian marine waters has been about opening the Lofoten – Vesterålen areas for offshore oil and gas exploration. This paper outlines the political and management processes and reviews the arguments for and against. Our conclusion is that these valuable areas should not be opened for such activity because of their high biological significance as the main spawning grounds for northeast Arctic cod (*Gadus morhua*) and other important fish stocks in the northeast Arctic waters.

Keywords: cod, Lofoten, oil.

Introduction

In a recent interview with the Norwegian business newspaper, the chief executive officer (CEO) of TOTAL (a French multinational integrated oil and gas company and one of the world's five or six largest publicly owned oil and gas companies: http://en.wikipedia.org/wiki/Supermajor - cite_note-reut1808-1) expressed scepticism about offshore oil exploration in areas off Lofoten–Vesterålen on the Norwegian continental shelf (*Dagens Næringsliv*, Norway, 1 December 2012). "There is no such thing as zero risk," he argued. "Macondo happened," he added, referring to the accident in the Gulf of Mexico in May 2010. Therefore, he advocated caution when considering new areas for oil exploration. In an interview with the *Financial Times* in November 2012, he had also said "no" to oil exploration in the ice-covered areas of the Arctic. A few days after the article in *Dagens Næringsliv*, the managing director of TOTAL, E&P Norway A/S explained that the CEO's astonishing statements "were given in a global context" and added that TOTAL shared the viewpoint of other companies active in Norway—that there is a need for access to new areas for the offshore oil industry on the Norwegian continental shelf (*Dagens Næringsliv*, Norway, 5 December 2012). Along with other leaders in the oil industry, he further argued that the time had come for an impact assessment of future petroleum activities in the Lofoten–Vesterålen areas. In the Norwegian petroleum management system, an impact assessment is the first step towards opening new areas for petroleum activities.

Political debate

In light of the political debate in Norway regarding the development of the offshore oil industry in the last decade, the statements by the CEO of TOTAL are remarkable. Until now, representatives of the oil industry have argued unanimously for access to new areas farther north on the Norwegian continental shelf, including the subareas Nordland VI, Nordland VII, and Tromsø II off Lofoten–Vesterålen (Figure 1). Representatives from the fisheries sector, from non-governmental environmental organizations, and some local interest groups have argued strongly against opening the Lofoten–Vesterålen areas for offshore oil exploration. Conversely, other local and regional interest groups are in favour of opening the areas.

Norwegian political parties have divergent views on the issue as well. During 2002–2005, Norway was governed by a minority coalition of Christian democrats, conservatives, and liberals. Since 2005, Norway has had a majority "red–green" coalition in power, led by social democrats, with participation from the centre and socialist parties. Both coalitions include parties with different opinions on whether the Lofoten–Vesterålen areas should be opened for oil prospecting.

To handle this rather delicate political issue in a balanced manner, based on the best possible knowledge, the Christian democrat Prime Minister launched the concept of integrated ocean area management plans in his televised New Year's address on 1 January 2002. The first ocean area management plan was to be

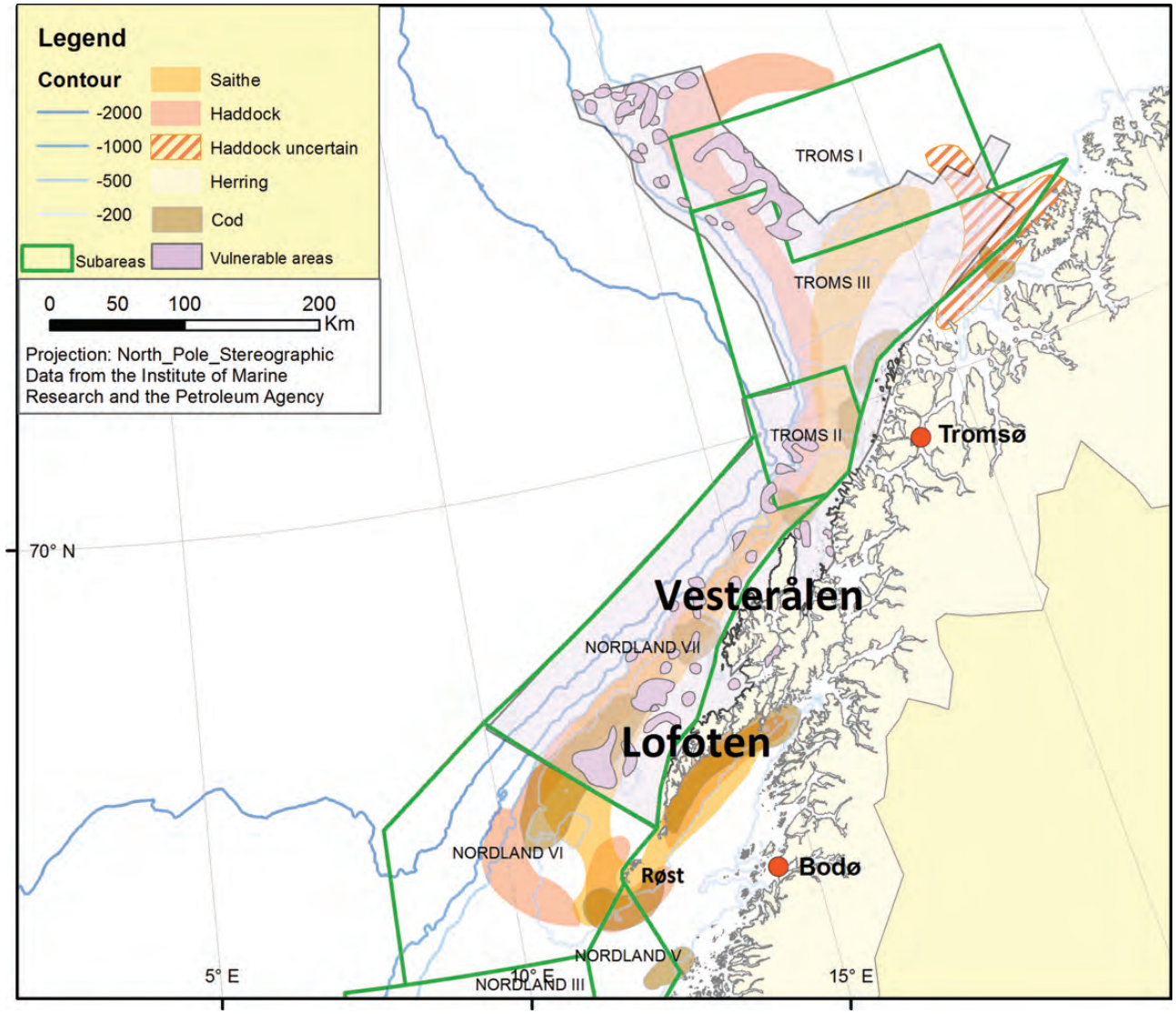

Figure 1. Spawning grounds for cod, herring, haddock, and saithe off the Lofoten–Vesterålen regions in northern Norway, vulnerable areas with fragile bottom fauna (deepwater coral reefs etc.), and subareas for allocation of petroleum licenses (depth contours in metres).

developed for the Lofoten–Barents Sea area; by 1 October 2003, a report on the living marine resources and ocean environment of the area was completed (Føyn *et al.*, 2002).

The management plan process was led by the Ministry of the Environment, with participation by the ministries of Fisheries, Trade, Justice, and Foreign Affairs. About 30 directorates, agencies, and research institutes were involved. Underlying documents for Fisheries, Shipping, Oil Industry, Marine Environment, and Vulnerable Areas had been developed by 2005 (Olsen *et al.*, 2007; Winsnes and Skjoldal, 2008). The first Lofoten–Barents Sea management plan was presented as a white paper to the Norwegian Parliament and ratified in June 2006. Through a similar process, an area management plan was developed in 2009 for the Norwegian portion of the Norwegian Sea (Ottersen *et al.*, 2011), and a plan for the Norwegian zone of the North Sea is scheduled for 2013.

When the red–green coalition assumed leadership in Norway after winning the parliamentary elections in 2005 and 2009, their policy declarations stated that Lofoten–Vesterålen would not be opened for offshore oil exploration in the coming term. Still, the Lofoten–Barents Sea management plan was revised in 2011 as a new white paper ratified by the Parliament. The revised plan stated that the vulnerable areas off Lofoten–Vesterålen should remain closed for offshore oil exploration for the next four years. But the government immediately initiated further data collection on the impact of offshore oil exploration on fisheries, tourism, the marine environment, and coastal societies at local and regional scales. Apparently, the conclusions reached when the revised management plan was ratified were difficult for some parties and stakeholders to accept, and a conciliatory process had to be launched.

A recent report from the Ministry of Petroleum and Energy concluded that the prospects for oil and gas in the Lofoten–Vesterålen areas are quite good (Ministry of Oil and Energy, 2012). Estimates based on geological models, with input from seismic surveys carried out in 2007–2009, indicate a 95% probability for 76 million Sm^3 oil equivalents and a 5% probability for >370 million Sm^3 oil equivalents (Anon., 2010a). Regionally, this would give 400–1100 new jobs in the oil sector and 800–2300 new jobs in the nation as a whole (Ministry of Oil and

Energy, 2012). The value creation would be of the order of 26–56 billion NOK (Ministry of Oil and Energy, 2012). But despite such good prospects for value creation and new jobs, the issue of opening the Lofoten–Vesterålen areas is so controversial that the Minister of Petroleum and Energy concluded that the areas would not be opened for offshore oil exploration by the present government.

Intrinsic values

So why is it so difficult for the offshore oil industry to gain access to the Lofoten–Vesterålen areas? The foremost reason is that the areas represent the main spawning grounds for several economically and ecologically important fish stocks, particularly the large northeast Arctic (NEA) cod (*Gadus morhua*) stock. Other commercially important species, such as NEA haddock (*Melanogrammus aeglefinus*), Norwegian spring-spawning herring (*Clupea harengus*), and NEA saithe (*Pollachius virens*), spawn in the areas. In addition, the areas harbour large seabird colonies, sensitive benthic habitats, and populations of marine mammals.

Every winter, the NEA cod migrate from the Barents Sea and the waters around Svalbard to the banks and fjords of Lofoten–Vesterålen (Figure 1) to spawn (Olsen *et al.*, 2010; Yaragina *et al.*, 2011). The fish gather on the spawning grounds in February–March, with peak spawning around 1 April (Pedersen, 1984). The fish can be caught with jigs, handlines, gillnets, and Danish seine, and the fisheries have traditionally been conducted from small coastal vessels. The Lofoten winter fishery can be documented back about 1000 years to the time of the Vikings and has been a foundation for settlements in most of the coastal communities of northern and northwestern Norway. For centuries, trading of stockfish (dried cod) from this fishery was the main activity of the Hanseatic merchants in Bergen, at that time the largest city in Norway. Up to 33 000 fishers participated in the Lofoten winter fishery, landing about 81 000 t of cod (Anderssen-Strand, 1933; digitized reports in Norwegian from the Lofoten fishery from 1859 to the present available at http://www.fiskeridir.no/fiske-og-fangst/rapporter-utredninger/lofoten/rapporter-fra-lofotfisket). Now, most of the Norwegian quota of NEA cod is taken by larger seiners, gillnetters, and trawlers in the southern Barents Sea and off the coast of northern Norway. But, the Lofoten winter fishery is still important for the smaller vessels, and about 3200 fishers participated in the landing of about 37 000 t of cod in 2006 (Anon., 2006).

Arguments

As a central advisor to Norwegian fisheries and marine environment authorities, the Institute of Marine Research (IMR) has argued that the Lofoten–Vesterålen areas should not be opened to offshore oil exploration. The NEA cod is the basis for the main commercial fishery in the Barents Sea, with yields varying between about 400 000 and 700 000 t in recent years. The stock is managed jointly by Norway and Russia through the Norwegian–Russian Fisheries Commission (Hammer and Hoel, 2012). The annual TAC is shared equally between Norway and Russia, with about 43% to each, and 14% to third parties (EU, Iceland and Greenland). ICES has assessed the stock and determined it to be in very good condition (ICES, 2012), and the quota for 2013 is set at 1 million t by the Norwegian–Russian Fisheries Commission. Every year, the spawning stock migrates from the waters around Svalbard, in the northeastern and central Barents Sea, to the coast of northern Norway to spawn. The spawning areas vary slightly depending on weather patterns, but about 60% of the stock migrates to Lofoten–Vesterålen regardless of conditions (Sundby and Nakken, 2008). So, the Lofoten–Vesterålen area is undoubtedly of crucial importance to the largest cod stock in the world—and, therefore, to Norwegian, Russian, and EU fisheries.

The risk to an offshore oil industry in a vulnerable area like Lofoten–Vesterålen is a large accidental oil spill. The probability of such an accident is very low, but accidents happen, and when they do, the environmental impact can be severe, as in the case of the "Deepwater Horizon" platform at the Macondo well in the Gulf of Mexico in May 2010 (Norwegian Research Council, 2012; Bakke *et al.*, 2012; Mearns *et al.*, 2012). Granted, analysis of fisheries data for the affected coastal area in the Gulf of Mexico shows that the 2010 year-classes of commercially important species were not lost (Fodrie and Hech, 2011). Although large fish may be able to swim away from an oil spill area, the effects on free-floating eggs and larvae and less-mobile juveniles can be substantial, particularly if the spill occurs in late winter/spring/early summer. A large fraction of a recruiting year-class of cod at the Lofoten–Vesterålen spawning grounds could be lost, and the impact on spawning habitats and nursery areas may last for decades. In addition, seabird colonies, e.g. the Atlantic puffins (*Fratercula arctica*) at the Røst nesting sites, would be severely affected by an accidental oil spill. Likewise, the picturesque Lofoten Islands, where the tourist industry constitutes an increasingly important economic activity, could become heavily soiled.

In addition to IMR, other advisory bodies to the Norwegian government—the Norwegian Polar Institute, the Climate and Pollution Agency, and the directorates of Nature Management and Fisheries—all argue against opening the Lofoten–Vesterålen areas to offshore oil exploration.

Where science comes into play

Thus far, scientific advice, fisheries interests, and environmental protection arguments appear to have prevented the opening of the Lofoten–Vesterålen areas to the offshore oil industry. A future government might decide otherwise, however. Innovative technological development may also substantially reduce the risk of accidental oil spills, thereby making a possible opening of the Lofoten–Vesterålen areas for offshore oil exploration a less divisive issue. In the meantime, the oil industry engaged on the Norwegian continental shelf can still enjoy an historically high activity level owing to the discovery of a large new reserve in the North Sea—the Johan Sverdrup field discovered off Stavanger—and by exploring less controversial areas in the southern Barents Sea.

The issue boils down to the question of whether some areas have such a high biological value—regardless of the economic value of associated fisheries—that even low risks of accidental spills are unacceptable—regardless of the monetary benefits of petroleum development. The possibility of opening the Lofoten–Vesterålen areas to petroleum activities has become the focus issue of a united environmental lobby in Norway. The oil industry argues that the risk is minute and that even a large spill only affects a fraction of the stocks and might be remedied within 1–3 years. However, their underlying analyses are fraught with methodological errors and uncertainties related to the data used to run the risk models (Anon., 2010b). The uncertainties are seldom mentioned by the oil lobby, but as marine scientists—providers of the data—we are well aware of the shortcomings (Anon., 2010b).

Conclusion

The consequences of underestimating the environmental risk in a uniquely valuable and sensitive area such as Lofoten–Vesterålen would be much more serious than in any other part of the Norwegian marine environment. Faced with such uncertainty and dire potential consequences, the precautionary approach should come into play and the government should refrain from allowing potentially harmful petroleum activity until all problems are resolved.

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