



## **INTERTEK MOODY MARINE**

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Authors: S. Lockwood, G. Pilling, A. Hoel, A. Hough, S. Davies

Final Report for

## **NORTH EAST ARCTIC INSHORE HADDOCK FISHERY**

Client: Norwegian Sea Food Export Council

**Certification Body:**

Intertek Moody Marine Ltd  
Merlin House  
Stanier Way  
Wyvern Business Park  
Derby. DE21 6BF  
UK

Tel: +44 (0) 1633 544663  
Fax: +44 (0) 1633 675020

**Client Contact:**

Norwegian Seafood Export Council  
Strandveien 106  
Postboks 6176  
9291 Tromsø

Tel: 0047 77 60 33 33

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## 1. SUMMARY

This report contains the assessment of the Norwegian Inshore Haddock Fishery against the Marine Stewardship Council's (MSC) Principles and Criteria for sustainable Fishing. It should be noted that the offshore component of the haddock fishery was previously certified by Moody Marine in 2010, together with the offshore cod fishery. This assessment now deals with the inshore (within 12 nm limit) haddock fishery within Norwegian waters; a parallel assessment is currently underway for the inshore cod fishery.

The assessment was carried out by a team of five assessors: Dr. Stephen Lockwood, Dr. Graham Pilling, Dr. Alf Hakon Hoel, Dr. Andrew Hough and Seran Davies. Peer Reviews were undertaken by Dr. Jake Rice (Canada) and Dr. Mike Pawson (UK).

The evaluation of the fishery against the MSC Principles and Criteria was undertaken following a site visit to the fishery and relevant stakeholders in Norway. Information gathered during this site visit was then used in conjunction with other available literature to produce a draft report and score the fishery against the MSC Performance Indicators. The draft report and scores of the fishery were then supplied to the client for review before being submitted to peer review. This draft report is now available on the MSC website for stakeholder comment for a period of 30 days.

The following gear types were assessed for certification: trawls, long line, gillnets, Danish seine and hook and line.

Main weaknesses identified during the assessment were the impacts to retained non-target species (including, but not limited to, coastal cod), a lack of gear specific data relating to the interactions of Endangered, Threatened and Protected (ETP) species and impacts on sensitive habitats such as cold water corals by specific gear types.

The overall results of the assessment concluded that Moody Marine has determined that each gear type used in the fishery should be certified in accordance to the MSC principles and criteria subject to 3 conditions which are summarised as follows:

**Condition 1: Retained non-target species.** Concerns were raised on the impacts of catches on non-target populations and the condition stipulates that such removals must be evaluated and specific mitigation measures implemented if deemed necessary.

**Condition 2: ETP Species.** The team discovered a lack of gear specific information relating to the interactions of ETP species within the fishery. This condition requests the development of a statistically rigorous monitoring programme relative to gear type. Appropriate measures should be designed and implemented where interactions are found to be unacceptable (within the time frame stated).

**Condition 3: Impacts on sensitive habitats.** A condition was raised over the use of gill nets, long line, Danish seine and demersal trawls in sensitive habitat areas. This condition requires a potential impact assessment on these sensitive habitats with appropriate mitigation depending upon the outcome of the assessment.

## 2. INTRODUCTION

This report sets out the results of the assessment of the North East Arctic Inshore Haddock Fishery against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing.

### 2.1 The fishery proposed for certification

The MSC Guidelines to Certifiers specify that the unit of certification is "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework." The fishery proposed for certification is therefore defined as:

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Trawl**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Long-line**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Gill-net**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Danish Seine**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Hook and Line**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

It should be noted that the original unit of certification for these fisheries were combined inshore and offshore stocks as a single Unit of Certification for each gear type. Following an initial review, at which the significant issue of coastal cod bycatch was identified, each Unit of Certification was split into an offshore (outside of 12 nm limit) and inshore (inside of 12 nm limit) component (see Advisory to Stakeholders; Clarification on Unit of Certification 17 November 2009). The offshore component, which does not interact with the coastal cod stocks, was then certified in April 2010. The inshore component, which does interact with the coastal cod stocks, is now moving forward with the main assessment – on the basis that a suitable rebuilding plan for coastal cod has now been implemented (see Advisory to Stakeholders; Resumption of Assessment of Inshore Cod and Haddock

Fisheries, 14 January 2011).

In the course of the certification it is possible that further companies/vessels may join the client group. This would be in accordance with the MSC's stated desire to allow fair and equitable access to the certification.

## **2.2 Report Structure and Assessment Process**

The aims of the assessment are to determine the degree of compliance of the fishery with the MSC Principles and Criteria for Sustainable Fishing, as set out in Section 8.

This report sets out:

- the background to the fishery under assessment and the context within which it operates in relation to the other areas where haddock are fished
- the qualifications and experience of the team undertaking the assessment
- the standard used (MSC Principles and Criteria)
- stakeholder consultation carried out. Stakeholders include all those parties with an interest in the management of the fishery and include fishers, management bodies, scientists and environmental Non-Governmental Organisations (ENGO's)
- the methodology used to assess ('score') the fishery against the MSC Standard.
- a scoring table with the Scoring Indicators adopted by the assessment team and Scoring Guidelines which aid the assessment team in allocating scores to the fishery. The commentary in this table then sets out the position of the fishery in relation to these Scoring Indicators.

The intention of the earlier sections of the report is to provide the reader with background information to interpret the scoring commentary in context.

Finally, as a result of the scoring, the Certification Recommendation of the assessment team is presented, together with any conditions attached to certification.

In draft form, this report is subject to critical review by appropriate, independent, scientists ('peer review'). The comments of these scientists are appended to this report. Responses are given in the peer review texts and, where amendments are made to the report on the basis of peer review comments; these are also noted in the peer review text. Following peer review, the report is then released for public scrutiny on the MSC website.

The report, containing the recommendation of the assessment team, any further stakeholder comments and the peer review comments is then considered by the Moody Marine Governing Board (a body independent of the assessment team). The Governing Board then make the final certification determination on behalf of Moody Marine Ltd.

It should be noted that, in response to comments by peer reviewers, stakeholders and the Moody Marine Governing Board, some points of clarification may be added to the final report.

Finally, the complete report, containing the Moody Marine Ltd Determination and all amendments, will be released for further stakeholder scrutiny.

## **2.3 Stakeholder meetings attended**

Information used in the main assessment has been obtained from interviews and correspondence with stakeholders in the Haddock fishery, notably:

11. Norwegian Seafood Export Council	Tor Larsen
12. Fiskeridirektoratet, Bergen	Thorbjorn Thorvik
13. Institute of Marine research	Asegir Aglen
14. WWF-Norway	Nina Jensen
15. Norwegian Seafood Federation	Jorulf Straume
16. Norwegian Fishermans Association	Jorn Pedersen
17. Norwegian Ministry of Fisheries & Coastal Affairs	Sverre Johansen

## 2.4 Other information sources

Published information and unpublished reports used during the assessment are listed below:

### Principle 1

ACOM, 2011a. Report of the Advisory Committee on Fishery Management, Advisory Committee on the Marine Environment and Advisory Committee on Ecosystems, 2007: 3 The Barents and the Norwegian Seas. *Conseil international pour l'Exploration de la Mer ACOM Advice Book 3*: 3.4.3. Northeast Arctic haddock (Subareas I and II).

ACOM, 2010c. Report of the Advisory Committee on Fishery Management, Advisory Committee on the Marine Environment and Advisory Committee on Ecosystems, 2007: 3 The Barents and the Norwegian Seas. *Conseil international pour l'Exploration de la Mer ACOM Advice Book 3*: 3.3.3.1. Request by the Norwegian ministry of fisheries and coastal affairs: Evaluation of a rebuilding plan for coastal cod.

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ICES (2011b). Arctic Fisheries Working Group report 2011. Cod in subareas I and II (Norwegian Coastal Waters) (<http://www.ices.dk/workinggroups/ViewWorkingGroup.aspx?ID=28>).

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<http://www.regjeringen.no/nb/dep/fkd/dok/regpubl/stmeld.html?id=290&epslanguage=NO>

WWF 2009

### **Acts and regulations**

Act of 3 June 1983 No 40 on Salt Water Fisheries

Act of 26 March 1999 No 15 concerning the right to participate in fisheries and hunting

Forskrift om endring av forskrift om satelittbasert overvåking av fiske- og fangstfartøys aktivitet. J-86-2008. [http://www.fiskeridir.no/fiskeridir/content/view/full/944/\(offset\)/20](http://www.fiskeridir.no/fiskeridir/content/view/full/944/(offset)/20)

Forskrift av 22. Desember 2004 nr 1878 om utøvelse av fisket i sjøen. [http://www.fiskeridir.no/fiskeridir/content/view/full/944/\(offset\)/20](http://www.fiskeridir.no/fiskeridir/content/view/full/944/(offset)/20)

Lov av 3. Juni 1983 nr. 40 om saltvannsfiske m.v.

### 3 GLOSSARY OF ACRONYMS USED IN THE REPORT

ACOM	Advisory Committee on the Marine Environment
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
$B_{pa}$	Precautionary Biomass Reference Point, a theoretical trigger for management action
$B_{lim}$	Limit Biomass Reference Point below which the stock is likely to suffer reduced productivity
$B_{MSY}$	Biomass associated with fishing at $F_{MSY}$
BSMP	Barents Sea Management Plan
CITES	Convention on International Trade in Endangered Species
COFI	FAO Committee of Fisheries
CPUE	Catch per Unit Effort
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ETP	Endangered, Threatened, Protected Species
FAO	Food and Agriculture Organisation of the United Nations
HCR	Harvest Control Rule
ICES	International Council for Exploration of the Sea
IMR	Institute of Marine Research
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unregulated and Unreported Fishing
IWC	International Whaling Commission
JNRFC	Joint Norwegian–Russian Fishery Commission
MAREANO	Marine Area Database for Norwegian Coast and Sea Areas
MSC	Marine Stewardship Council
NAMMCO	North Atlantic Marine Mammal Commission
NEA	North East Arctic
NEAFC	North East Atlantic Fishery Commission
NINA	Institute of Nature Research
NSEC	Norwegian Seafood Export Council
PINRO	Russian Institute for Polar Research
SCANS	Small Cetacean Abundance in the North Sea
SEAPOP	Seabird Population Management and Petroleum Operations
SSB	Spawning Stock Biomass
TAC	Total Allowable Catch
UNCLOS	United Nations Law of the Sea
VPA	Virtual Population Analysis
WGEF	ICES Working Group on Elasmobranch Fisheries
WWF	World Wildlife Fund
XSA	Extended Survivor Analysis

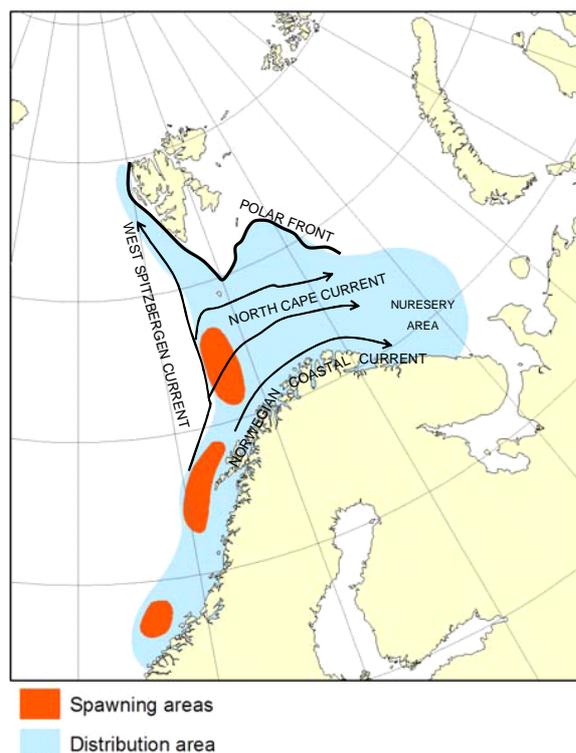
## 4 BACKGROUND TO THE FISHERY

### 4.1 Biology of the Target Species

The haddock *Melanogrammus aeglefinus* is found throughout the boreal–temperate North Atlantic Ocean from Cape Hatteras (36° 33' N, 75° 52' W) on the east coast of North America to the Celtic Sea, south of Ireland. Although it is the same species throughout this geographic range it forms a number of regional and local populations that are sufficiently isolated from other populations of the same species that they can be managed as separate stocks. The population found in the Barents Sea, north of Norway, is one such stock; for assessment and management purposes it is known as the North East Arctic haddock stock.

During the course of its life history, North East Arctic (NEA) haddock are found from the coastal waters of western Norway, north of 62° N, and throughout the Barents Sea. The extent to which the NEA haddock move north and east in the Barents Sea is influenced by the position of the Polar Front (Figure 1; Mastov, 1944). Throughout the year, NEA haddock are also found in association with NEA cod (*Gadus morhua*) and saithe (*Pollachius virens*) as well as other, less abundant, species such as various rajid elasmobranchs and Greenland halibut *Reinhardtius hippoglossoides* (Mastov, 1944).

In the early months of the year, mature haddock migrate southwards from the Barents Sea to the west coast of Norway where they spawn, mostly along the shelf edge, March–May (Stiansen et al., 2005). After spawning, the adult fish migrate northwards to their summer feeding grounds in the Barents Sea (Mastov, 1944; Ponomorenko, 1996). The extent of the summer–winter haddock distribution within the Barents Sea varies from year to year in response to temperature and the distribution and abundance of prey species (Mastov, 1944). Their migrations extend to the Svalbard Shelf in the north and eastwards towards Nova Zemlya but the extent of the distribution is limited by the Polar Front associated with the ice sheet.



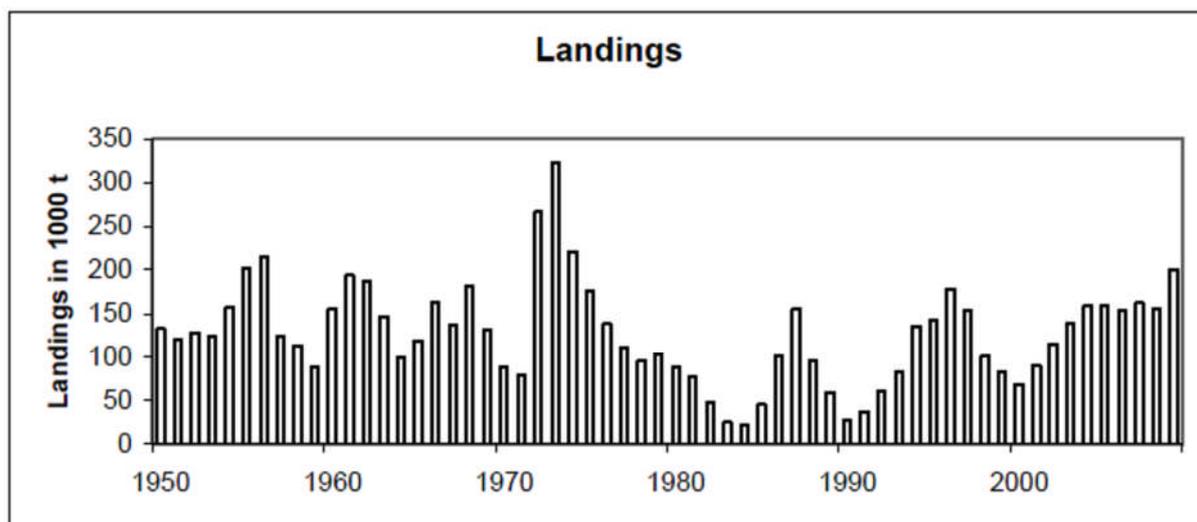
**Figure 1:** North East Arctic haddock spawning, nursery and adult feeding grounds (Stiansen et al., 2005).

The planktonic eggs and larvae drift northwards from the spawning grounds, initially in the Norwegian coastal current but subsequently further north in the West Spitzbergen current or, predominantly, eastwards in the North Cape current. It is this latter current that carries the larvae and juvenile haddock towards the main nursery areas that are found towards, and in the Russian sector of the south-eastern Barents Sea (Mastov, 1944; Ponomorenko, 1996). The juvenile haddock remain in the relatively shallow water of the south-eastern Barents Sea for the first few years of life but gradually move into deeper water where they recruit to the spawning stock at 5–10 years of age.

#### 4.2 History of the Fishery

Historically, the Barents Sea gadoid fisheries have been driven by the demand for cod. With the possible exception of localised and possibly seasonal targeted fisheries, haddock form a by-catch in the NEA cod fishery. Over the past half century or so, the landings have varied between 50 000 and 250 000 t, an average of perhaps 25% the cod landings. It was only in the early 1970s, when NEA cod stock and landings were experiencing a slump, did the NEA haddock landings approach a comparable level of 300 000 t (Figure 2).<sup>R13</sup>

Following the First World War (1914–1918) increasing numbers of steam trawlers, in particular vessels from Germany and the UK, began working in the Barents Sea. This fishery, which was virtually unrestricted in international waters beyond the narrow coastal strip of coastal states' territorial seas, resumed after the Second World War (1939 – 1945) and continued until coastal states declared 200 mile exclusive fishing zones in 1977. Since then access to the Barents Sea by non-coastal states has been restricted to licensed vessels but the total reported international landings continue to fluctuate between c.50 000 and 150 000 t (Fig 2); 146 830 t in 2007 (agreed TAC 2007, 150 000 t; 2008, 155 000 t).



**Figure 2:** Landings of NEA haddock reported to ICES 1946 – 2009 (copied from ACOM, 2010).

Following the United Nations conference on the Law of the Sea (UNLOSC, 1976), coastal states, including Norway and Russia, established 200 nautical mile exclusive fishing zones. With the exception of a relatively small triangle of international waters in the eastern Barents Sea and a larger area between mainland Norway and Jan Mayen, the Barents Sea and Norwegian Sea fall within the 200 mile exclusive fishing zones of Norway and Russia (

Figure 3). The international fishery is carried out almost exclusively by trawlers but there are also coastal-state vessels using traditional fishing gears such as gill net, long line and Danish seine.

The offshore fleets have been subject to quota management since 1978 and the inshore fleets since 1989. In addition to quotas, the fishery is regulated by a minimum catch size (44 cm), a minimum mesh size in trawls and Danish seines (135 mm plus 55 mm sorting grid in Norwegian sector; 125 mm plus 55 mm sorting grid in Russian sector). Furthermore, in the Norwegian sector there are a range of limits applied to conventional (inshore) gears, including prohibitions on fishing for redfish north of 62° between March and June and in September, and a bycatch limit of 20% at other times and in other areas, limits on the intermixture of cod, haddock and saithe (15%) under the minimum size when fishing north of 62°, a ban on discarding and closure of areas having high densities of juvenile haddock, cod, or other quota-managed species, as well as seasonal and area restrictions. Evaluations of this system have shown a clear decrease in the discarding of small cod and haddock (ACOM, 2011a)

Given that TACs within the coastal fishery for NEA haddock are a sub-set of the total TAC developed under international research and management, this element of the fishery must be discussed.

Under treaty terms agreed between Norway and Russia, the NEA fisheries are now managed by the Joint Norwegian–Russian Fishery Commission (JNRFC). Fisheries in the international waters fall under the management auspices of the North East Atlantic Fishery Commission (NEAFC).

The JNRFC convene regular meetings to discuss the management of the NEA fisheries and Norwegian and Russian scientists meet annually to discuss research and environmental and resource management throughout the Barents Sea (Anon, 2007). These scientists also participate in the Arctic Fisheries Working Group convened each year by ICES (AFWG, 2008). It is ICES that provides the internationally peer-reviewed scientific advice on the status of the stock and its future exploitation to both the JNRFC and NEAFC. The recommended TAC is based on a harvest control rule (HCR; see §

5 below) agreed by both parties to the JNRFC.

In addition to the fleets of Norway and Russia, NEA haddock are exploited by vessels registered in other NE Atlantic states targeting NEA cod: the Faroe Islands [1.6% estimated total international landings 2007 (161 383, incl. IUU); AFWG, 2008], France (0.2%), Germany (0.7%), Greenland (0.9%), Spain (0.2%), United Kingdom (+) and 'Others' (2.3%). The bulk of the catch is taken by Norway (44.0%) and Russia (41.1%) but throughout this fishery there is a long history of illegal, unreported and unregulated (IUU) landings.

It is recognised by both parties to the JNRFC agreement that the problem is primarily one involving fishing, transshipping and landing in the Russian sector. In the past, IUU catches may have accounted for more fish than any single country's reported landings but closer surveillance of offshore fishery activity (i.e. not only fishing but also transshipping at sea and passage of fishery-product reefer vessels through the Norwegian sector) and cooperation from receiving-port state control, negotiated through NEAFC, is gradually reducing the IUU landings (Fiskeridirektoratet, 2008). In 2005 the Norwegian Directorate of Fisheries, the body responsible for monitoring and enforcement of fishery related activity, estimated IUU fishing was 40.000 t, i.e. >30% the reported landing figure. By 2007 the Norwegian Directorate of Fisheries was confident (pers. comm.) that IUU landings in 2007 were less than 15 000t (<10%) and the Directorate is optimistic that it will continue to decline. This improvement is the result of greater compliance within the catching and transshipping sector, increased collaboration with and reporting by ports receiving fishery products originating from the Barents Sea, and growing international reluctance to trade in IUU catches. This has been successful, to the extent that in 2009 and 2010, the level of IUU catches considered in the stock assessment has been zero.



**Figure 3:** The Norwegian 200 mile fishery limits (---), Russian zone and the triangle of international waters in the Barents Sea. \*Adjacent Area is covered by a temporary agreement between Norway and Russia. (Chart provided by Norwegian Ministry of Fisheries & Coastal Affairs)

### 4.3 Fleet and Gear Description

Historically, haddock has not been a primary target species for Norwegian fisheries; it is cod fishing that has been an inherent part of the Norwegian tradition, culture and national character. Overall, this is still probably the case, with haddock providing a useful, quota-controlled bycatch in the offshore, rather than the inshore fisheries. The total number of vessels engaged in NEA cod and haddock fishing runs into the thousands; the greatest number are the small inshore vessels fishing nets and lines within fjords and along the open coast; these vessels probably catch relatively little haddock. In contrast, the smallest component of fleet (in number) comprises the offshore trawl fleet but these vessels probably catch relatively more. All are subject to a complex framework of management regulation, some common to all vessels, other specific to vessel size, location or gear type. These management measures are described below (section 5); here, the description is limited to a general outline of fishing gear used, their seasons and locations. Although the descriptions are based largely on personal knowledge and experience, the majority of illustrations reproduced below are taken from *An Introduction to Commercial Fishing Gear and Methods Used in Scotland* published by Fisheries Research Services Marine Laboratory, Aberdeen (Galbraith et al., 2004), a publication that provides an ideal basic introduction to fishing gear and methods.

There is strict regulation of when and where Norwegian fishing vessels can operate by size, by gear and by season (details are given in Section 6 below).

#### 4.3.1 Trawlers

All Norwegian registered trawlers are engaged in single-vessel fishing; i.e., there are no pair trawlers towing a single net between them, each vessel tows its own trawl.

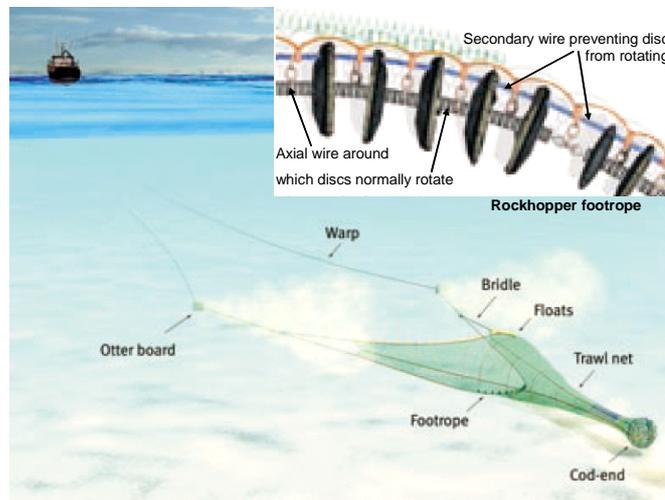
Over the years there has been a great variety of development in trawl design to improve capture efficiency of certain species, operation in certain localities, or to reduce operating costs. Until recently, however, pelagic trawling was prohibited within the Norwegian Territorial Sea and waters subject to Norwegian jurisdiction north of 64° N. As a response to growing concerns about demersal trawl-seabed interactions, the Norwegian Directorate of Fisheries has been issuing derogations for the use of pelagic trawls on a case-by-case basis and subject to monitoring by scientists from the Norwegian Institute of Marine Research (IMR), Bergen.

#### *Demersal trawls*

Historically, all trawling for demersal (bottom-dwelling) species such as haddock was undertaken with some variation of a standard demersal trawl such as is shown here (Fig. 4.4.1). The two towing warps lead from the fishing vessel to the otter boards, or doors, which act as paravanes to pull the net open horizontally. These boards weigh 2–4 t and drag across the seabed; in so doing they have considerable potential to disrupt seabed structure and break seabed reefs or other upright habitat. The boards are joined to the wing-end of the trawl by the bridles which herd fish into the path of the net but the lower parts of which can also drag across the seabed.

In a demersal trawl such as is shown here, the belly of the net, but probably not the cod-end is also in contact with the seabed, both abrading the seabed and suffering abrasion damage itself. In areas of relatively smooth seabed, e.g. sand or consolidated mud, the footrope can be relatively light and

simple. On hard, rocky seabed, such as is found through much of the Barents Sea and Norwegian Sea, it is common practice to fit a rockhopper footrope (Figure 4) that enables the trawl to ‘skip’ over all but the largest seabed rocks and boulders. In doing so, however, it can also disturb seabed structure and communities by turning rocks and boulders. On the larger vessels, the rockhopper discs (wheels) are 18–24 inches (sic) in diameter.



**Figure 4: Demersal Trawl**

### *Multi-rig demersal trawls*

The basic demersal trawl described above has a high energy demand because virtually all of the gear from doors to cod end is in contact with the seabed. This energy (fuel) demand can be reduced by maintaining the spread (distance) between the otter boards but dividing the net into two (twin-rig; or more – multi-rig) smaller trawls joined in the centre (Figure 5). The centre of the net is towed from a third warp and in place of the normal door, there is a heavy roller weight – the ‘clump’, attached to the central warp and central wing ends.

Although this twin-rig arrangement can reduce drag, and hence fuel costs, if door spread is kept the same as the corresponding standard rig demersal trawl, skippers often opt to maintain drag and go for greater spread to increase catch rates. This option increase the amount of trawl in contact and potential abrasion with concomitant effects on seabed structure and communities.

As with standard demersal trawls (Figure 4), twin-rig trawls can be fished with a simple, lightweight footrope or with rockhopper gear. The small number of Norwegian registered, twin-rigged trawlers engaged in the NEA cod fishery all operate with a rockhopper footrope.

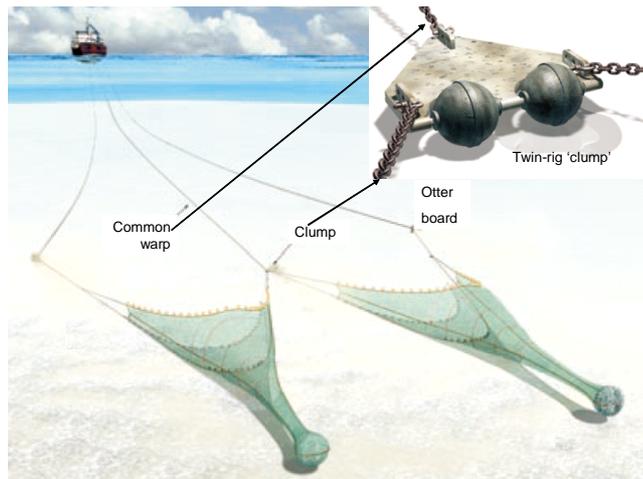
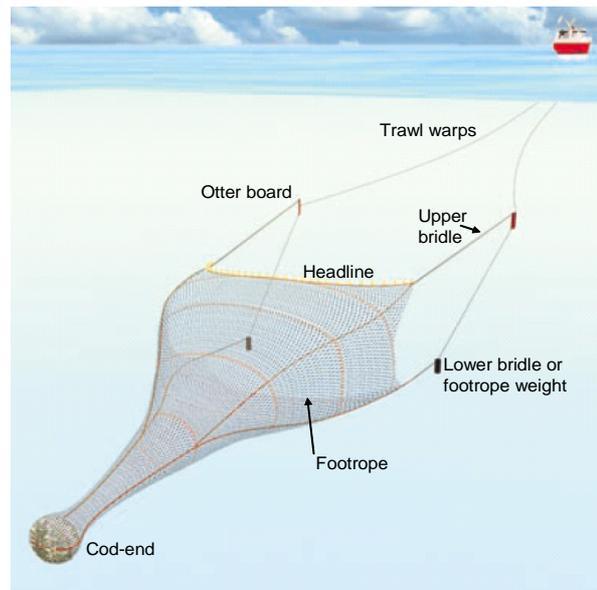


Figure 5: **Outline of a twin-rig demersal trawl with an enlarged view of a clump inset. (Bundles of chain are also often used for the clump.)**

### *Semi-pelagic and pelagic trawls*

Under current Norwegian fishery regulations, the use of pelagic trawls (Figure 6) is prohibited within the Norwegian 200' fishery zone north of 64° N. There is increasing pressure on the Norwegian fishery management authorities, however, to repeal this restriction. The industry wishes to move toward bottom-skimming, semi-pelagic or fully pelagic trawls as these are more fuel efficient than full demersal trawls. Environmentally, these gears have fewer adverse effects on ecosystem structure and function as they have either reduced or zero contact with the seabed and seabed communities.

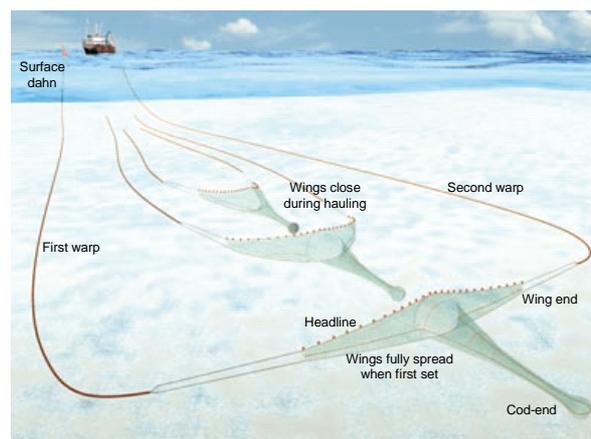
Among the key differences between demersal and pelagic trawls is that pelagic otter boards are larger (relative to the towing vessel) but never come into contact with the seabed. Whether they are used with a fully pelagic or a semi-pelagic trawl, the doors remain clear of the seabed, as do the bridles. Similarly, with both pelagic and semi-pelagic trawls, the body of the trawl from the belly to the cod end is towed clear of the seabed. The principle difference between the two gears is that a fully pelagic trawl is operated completely clear of the seabed, including the footrope, whereas semi-pelagic trawls are fished with the footrope in contact with the seabed. As with full demersal trawls, the bottom-skimming trawl footrope can be very light on clear sandy grounds or rockhopper gear on hard, rocky ground. At present, among Norwegian vessels fishing NEA Haddock, both options are being tried and results are subject to review by IMR.



**Figure 6:** Outline of a full pelagic, i.e. mid-water, trawl as used in many fisheries for herring and mackerel.

#### 4.3.2 Danish seine

There are several hundred Norwegian registered Danish seiners 10–40 m in length. The principle season for the majority of these vessels is January to May when they target either cod or haddock, but rarely take mixed catches. As a rule, cod fishing is best undertaken in daylight with saithe becoming the principal target species at night. From May to December, the seiners change to any one of the other methods of fishing available, but targeting cod rather than haddock. The seiners are prohibited from operating within the fjord closing lines (see section 6 for details) but otherwise operate widely throughout Norwegian waters, subject to restrictions on vessel size.



**Figure 7:** Outline of a Danish seine when first set and two further views during the process of hauling the seine.

The general outline of a Danish seine is not dissimilar to the conical-bag shape of demersal trawls. In common with trawls, the net is also worked with two warps but there the similarly ends; the warps

are wire-reinforced rope rather than heavy wire, there are no otter boards, only a simple cord-bound footrope is used and the gear is not towed *per se*.

Whereas a trawler can make an economic catch from fish that are dispersed over a wide area (duration of the trawl tow), seines need to be fished where there is a high density of fish. Hence, this method of fishing is most effective in the early months of the year as fish aggregate to spawn in the central-coastal waters of the Norwegian Sea. It is not effective in the Barents Sea where they disperse to feed. Once a suitable shoal is identified, the skipper sets a marker dahn (Figure 7) about one mile (for the largest vessels, proportionately less for smaller vessels) upstream of the target. The vessel then steams in the direction of, but to one side of the target, laying the first warp as it steams. As it nears the end of the warp the vessel is turned through 90° to lay the bridles and net 'behind' the shoal. Once the net and bridles are set, the vessel is turned towards the marker dahn, laying the second warp as it steams.

Once the marker dahn, to which the first warp is attached, has been recovered, the vessel begins to haul the warps. Traditionally, Danish seiners would have anchored at this stage to ensure they had something to pull against. Current generation Danish seiners have sufficient power that the vessel can hold position and haul the net 'on the fly', i.e. without anchoring. As hauling commences, the warps straighten and gradually move toward the centre line, herding the fish as they do so. At the same time, the bridles and wing-ends begin to move forward and toward the centre line. By the time the warps are almost fully recovered the wings from each side of the net will have met enclosing the catch within the seine and cod-end. During this hauling process, the net will be towed *c.* the length of the warps, i.e. *c.* one mile. The environmental footprint of Danish seines, both in term of fuel consumption and seabed interaction, is significantly less than for demersal trawlers.

### 4.3.3 Long Lines

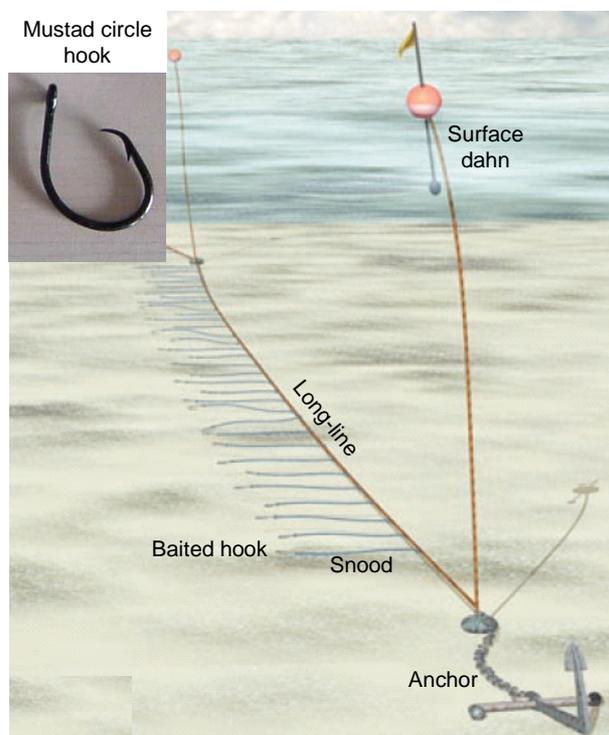
Long lines are among the oldest of the traditional static-gear fishing methods. It is a method used throughout the world from small, open inshore boats (i.e. <10 m) to large offshore vessels. This is no less true for the Norwegian fishing fleet than elsewhere; the largest Norwegian registered longliners are more than 50 m in length. In terms of fishing operations, the key difference is that the large, offshore vessels bait and shoot thousands of hooks automatically, whereas the small vessels manually bait and shoot a few hundred hooks each day.

Each long line comprises three key elements. At each end of the long line there is a surface dahn marker buoy with a line leading to an anchor; between the two anchors is the longline itself, the length of which varies with the size of boat and location of fishing. Set at 1.5–2 m intervals along the length of the long line are *c.* 0.5–0.75 m snoods to which baited Mustad No. 6 or 7 circle hooks (Figure 8) are attached. (Circle hooks have replaced traditional 'J' hooks as they are less prone to losing the catch.) When set, the line, snoods and hooks lay on the seabed (a feature that eliminates the risk of 'ghost fishing' once the bait has gone).

The smaller inshore boats bait and set their lines manually. The length of a line may be no more than a few hundred metres but an individual boat may set several lines relatively close together in the course of a day. Sometimes, these lines may be set and hauled the same day, on other occasions they may be left to fish overnight, but not longer as the catch may spoil or be eaten by predators and scavengers.

There is also a pelagic long line fishery specifically for haddock which operates during the summer season near the Finmark coast. This long line fishery uses mainly artificial bait on floating/pelagic lines and is deemed to be a very clean fishery for haddock.

A variety of bait is used, some being more effective than others in catching cod over haddock. The main bait is jig-caught *Ilex argentinus* (c. 60% of total) from the Falkland Islands jig-fishery. Other bait includes: Pacific saury (25%); NE Atlantic mackerel too small or damaged to be used by the processing factories (10%); Atlanto-Scandian herring (10%); ‘other’, including artificial Norbait made from reconstituted processing factory waste (5%). For haddock, the artificial bait “Pølse agn” (“Sausage bait”) has proved to be relatively successful in creating a more favourable haddock to cod mix

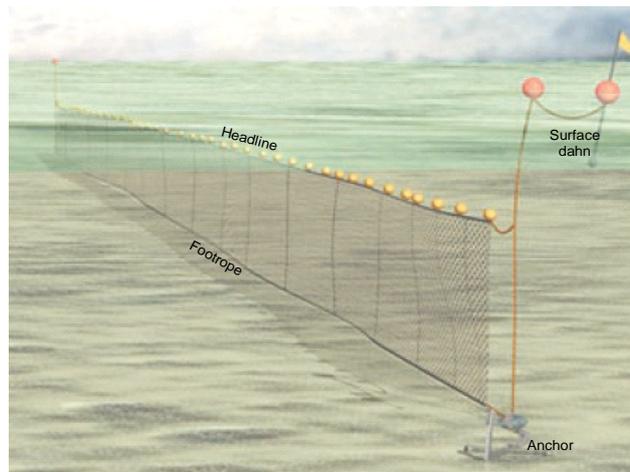


**Figure 8:** Outline of a basic, bottom-set long line

#### 4.3.4 Gill Nets

Gill nets come in a variety of shapes and sizes, depending on the target species. Those used in the Norwegian cod-haddock fishery comprise plain panel netting, as shown in Figure 9, with 180 mm stretched mesh (90 mm bar length) net panels. Each panel is 50 meshes high (footrope–headline) and c. 30 m in length but 20–50 panels (depending on vessel size and location) are joined to form one net or fleet. Whilst an anchor is used to hold the net at the initial shoot (upstream) end of the net, a simple 20 kg weight is often used at the other end.

The main gill-net season is January–April; it is not a practicable method of fishing in areas of strong tides or (normally) over periods of spring tides. The smallest vessel may set the nets and stand by them for a few hours before hauling and returning to harbour but national legislation requires that all gill nets are hauled and the catch removed every 24 h, or less. Gill nets are highly size selective, either not retaining fish small enough to pass through the meshes or not admitting fish that are too large. The 180 mm nets used in the Norwegian fishery retain cod and haddock that are c. 3 kg landed weight (i.e. gutted and headed or c. 4.5 kg live weight).



**Figure 9:** An outline of a gill net such as might be used in the Norwegian haddock fishery

#### **4.3.5 Hook and line**

Hook and line gears are mostly used by small vessels below 10m in length. They target species by area and depth working mainly on the open coast rather than in Fjords from February until May. It is a clean fishery targeting cod aggregations and saithe (it is not considered to be profitable for Haddock due to bait requirements but haddock may be caught and landed using this method).

Auto machine lines are used with 2 machines per man/vessel. There are between 7-12 hooks per line with number 4 Mustad J hooks being used. Artificial lures which look like sand eels are used.

## 5 STOCK ASSESSMENT

### 5.1 Management Unit

The ICES assessment of the NEA haddock covers ICES sub-Areas I (Barents Sea) and II (Norwegian Sea) and including the Norwegian and Russian EEZ, and international waters (Figure 4.3.2). There is relatively little targeted fishing for haddock, it is taken primarily as a quota-controlled bycatch in the much larger NEA cod fishery.

### 5.2 Assessments and stock status

Assessment of the NEA haddock stock is based on standard ICES virtual population analysis (VPA) analytical modelling methods, utilising catch-at-age data, validated by reference to research vessel trawl-survey abundance indices and CPUE from the Norwegian reference fleet. Biological sampling data underpinning the assessments include: catch at age, weight at age, natural mortality, maturity at age, and recruitment indices. Estimates of predation by NEA cod are included in the estimates of natural mortality.

Catches of all national fleets taking part in the NEA haddock fishery are monitored and landings are recorded. Non-coastal states exploiting NEA haddock do so under licence conditions set by the coastal states and JNRFC. These conditions require, *inter alia*, that all vessels record and report when and where they are fishing, with what gear, and the quantity and species composition of the catch. Within the Norwegian sector, all fishing vessels are subject to inspection by the Norwegian Coastguard, not only to ensure compliance with current fishery and conservation management measures but also to collect biological information on catch composition, size frequency and other biological variables. For inshore fisheries, monitoring generally focuses at landing, although at sea monitoring by the Coast Guard also occurs on issues such as the capture of undersized fish and illegal discarding. Given the 'risk-based' approach to the targeting of enforcement activity, identification of increased infringements of regulations in the coastal sector would lead to further at-sea coverage. The data collection programme includes targeted monitoring of Norwegian sector 'reference fleets' for, *inter alia*, demersal trawlers, pelagic trawlers, longliners and gill netters (Nedreaas et al, 2008). In autumn 2005 a specific coastal Reference Fleet was established along the entire Norwegian Coast from Varanger to Oslofjord. In 2007 this fleet was composed of 18 vessels (8-16 m long). The scheme trains fishing-vessel crew members to undertake self-sampling for bycatch, length, weights, removing otoliths and recording more detailed effort data than the minimum required for statutory log books. Results are cross-validated by comparison with Coastguard–scientific sampling programmes.) Some other fishing nations maintain biological monitoring programmes and these data also contribute to the annual stock assessment exercise. This provides a representative sampling of catches from the dominant fishing nation exploiting NEA haddock, as well as NEA and coastal cod.

Concerns about under-reporting of catches and their implications for the assessment and long-term sustainability of the fishery remain, although it is noted that ACOM (2010a) state that IUU catches have decreased in recent years and were considered to be zero in 2009. There are no direct, specific estimates made of IUU haddock landings; it is assumed that the ratio of haddock to cod in the reported landings is the best estimate of the IUU haddock: cod. Hence, the estimated average IUU haddock catch 2005, 2006, 2007 was 40 283, 21 451, 14 553 t respectively (AFWG, 2008). The more precautionary, Norwegian, unallocated catch estimate (14 553 t) has been used in recent stock assessment calculations (AFWG, 2008). In 2009, a joint Norwegian-Russian Analysis Group under the Mixed Norwegian-Russian Fisheries Commission provided joint estimates of IUU catches. Based on these, the AFWG decided to set the IUU estimate for haddock in 2009 to 0. It is also recognised that behavioural and seasonal changes in the catchability of haddock may affect the estimation of recruitment indices (Aglen *et al.*, 1997a & b).

The Norwegian Institute of Marine Research (IMR) and Russian Institute for Polar Research (PINRO), Murmansk, undertake a variety of independent and coordinated research programmes aimed at increasing the fundamental knowledge and understanding of biological and environmental variables affecting the population dynamics of NEA haddock. These include annual (acoustic) spawning surveys and surveys of the distribution of adults and juveniles throughout the Barents Sea (Aglen, 1996, Aglen et al., 1997a,b). These surveys add to the long time series of Barents Sea 0 group surveys, originally coordinated by and reported through ICES but more recently limited to IMR–PINRO. Thus, there is a significant body of reference data on life history, fecundity (Anon, 2002), spawning, distribution, growth, length at age, weight at length and maturity etc. all of which contribute to the stock assessment and help to minimise uncertainties affecting the assessment. These data are augmented by the landing records and catch monitoring data from other nations fishing in the NE Arctic (AFWG, 2008).

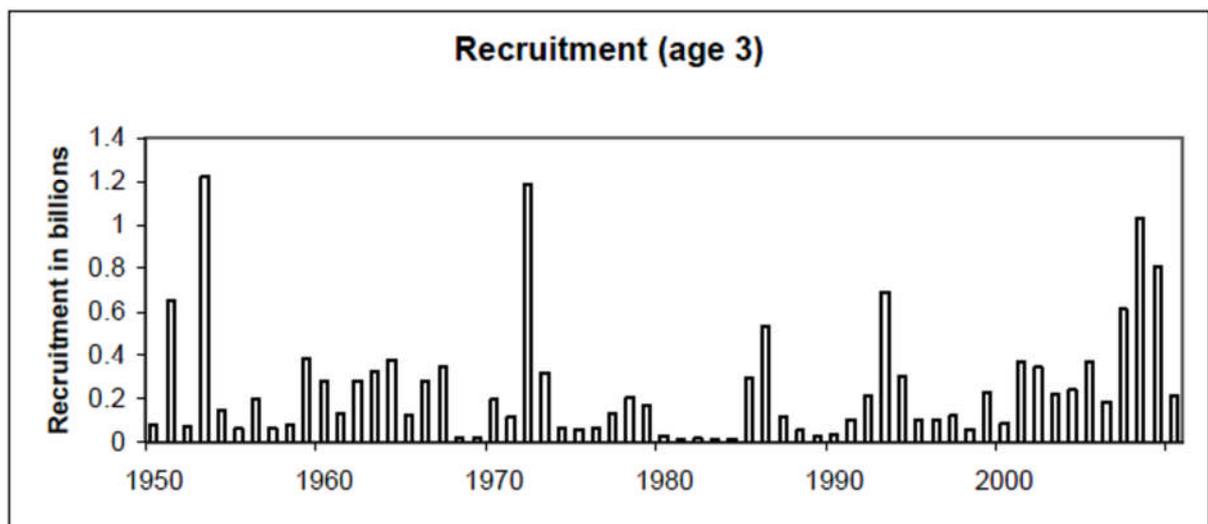
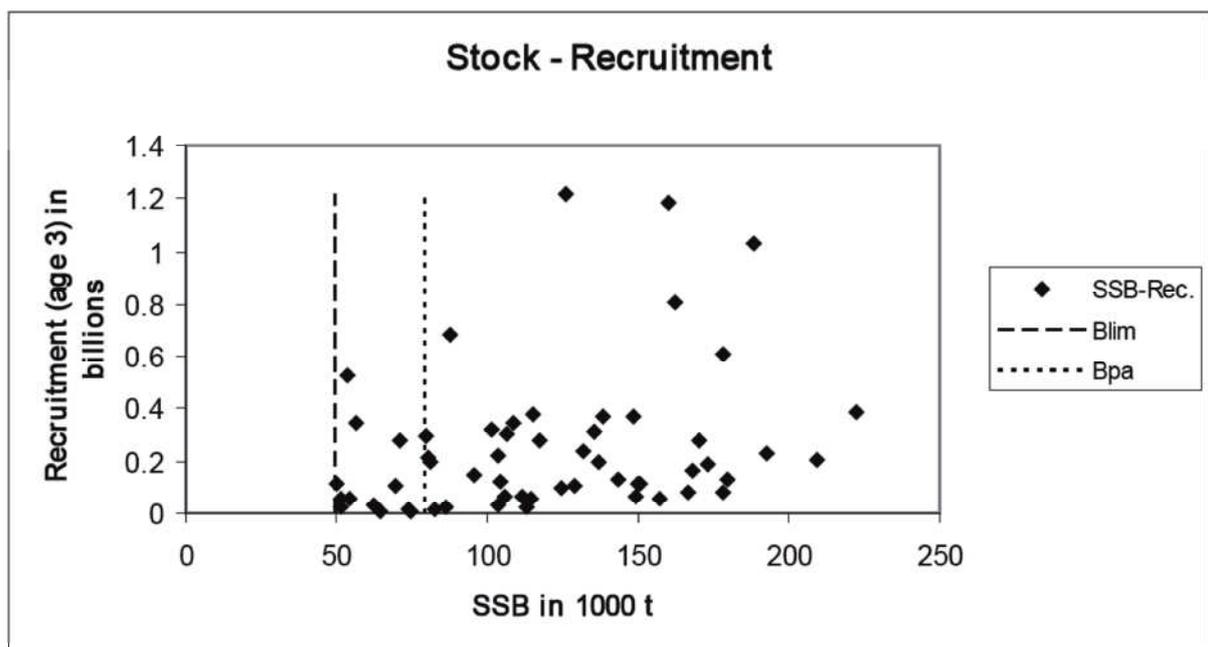


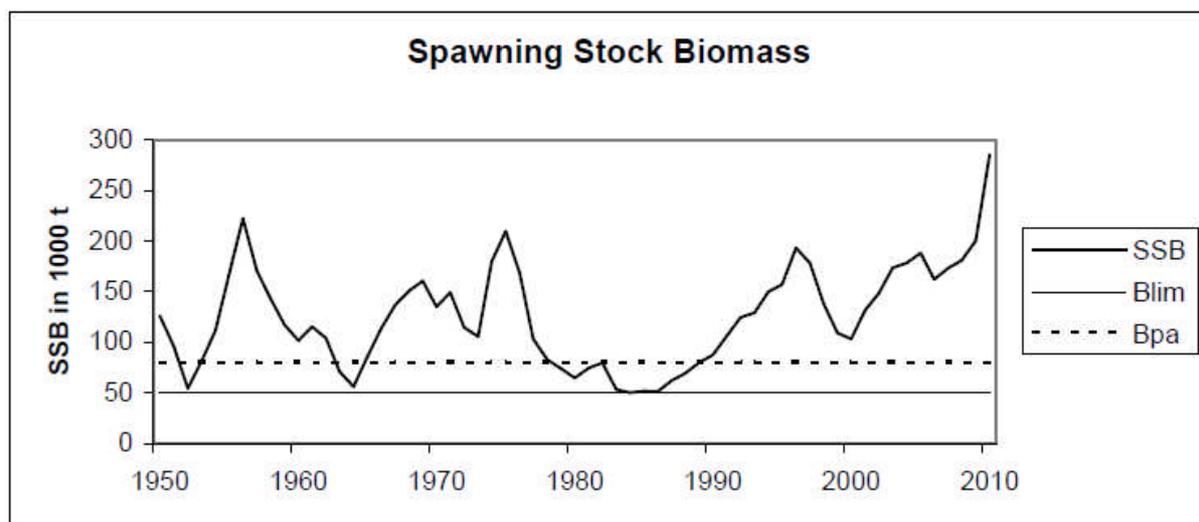
Figure 10: ICES working group estimates of NEA haddock recruitment at age 3 (ACOM, 2010a).



**Figure 11:** Estimates of NEA haddock recruitment and spawning stock biomass (SSB) 1950 – 2009 (from ICES, 2010b).

Estimates of recruitment are generated as a part of the age-based assessment model, moderated by the data collected as part of the annual trawl surveys.<sup>21</sup> While environmental influences on recruitment are noted (changes in the influx of Atlantic waters to the Barents Sea, water temperatures in the first years of the life cycle; ICES AFWG report 2011), this information is at present not taken into account in the assessment.

Estimates of recruitment over the past half century have been highly variable (Fig. 10) and indicate that when spawning stock biomass (SSB) is at a level equivalent to  $B_{lim}$ , recruitment can vary by at least an order of magnitude (Fig. 11) while the highest levels of recruitment exceed the lowest by at least two orders of magnitude and have occurred at intermediate levels of SSB (i.e.  $> B_{lim}$ ). It appears, therefore that good and poor year classes can occur at almost any level of SSB (Fig. 7) and for all practical purposes, there does not appear to be a stock and recruitment relationship. Environmental monitoring, however, suggests that good recruitment seems least likely when seabed water temperatures do not exceed  $3.75^{\circ}C$  in the eastern Barents Sea.<sup>R5,R10</sup>

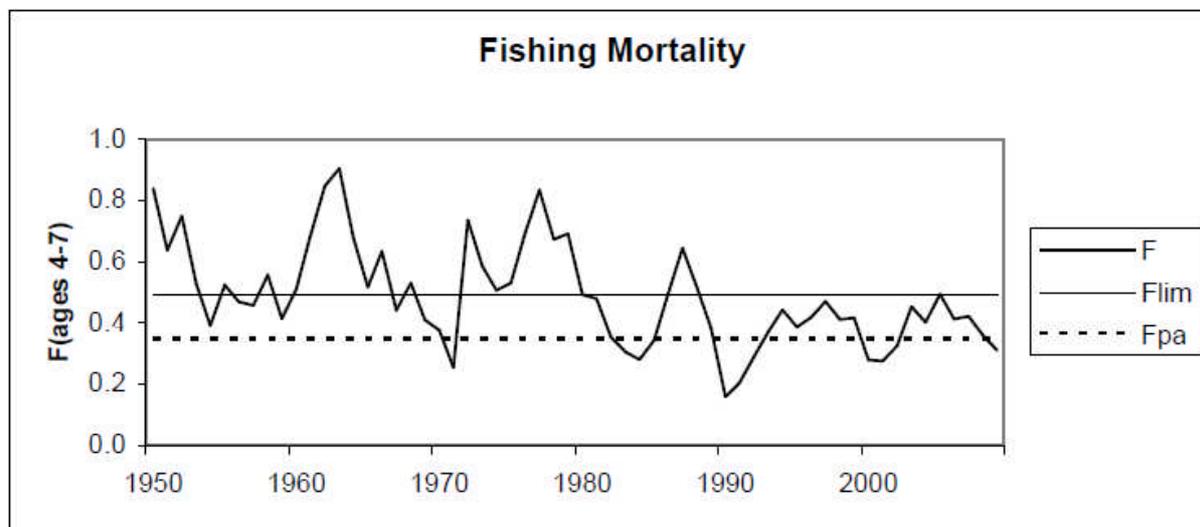


**Figure 12:** Estimates of NEA haddock spawning stock biomass 1950–2009 (ACOM, 2010a).

Reference points for NEA haddock were estimated by the ICES Arctic Fisheries Working Group, based upon the stock-recruitment relationship (Figure 11). The biomass reference points ( $B_{lim}$ , the limit reference point, currently the lowest biomass level seen in the stock history, and  $B_{pa}$ , the precautionary level estimated using a specific multiplier on  $B_{lim}$ ) previously adopted and currently used by ACFM for this stock are  $B_{lim}=50,000$  t and  $B_{pa}=80,000$  t. The fishing mortality reference points corresponding to these levels are  $F_{lim}=0.49$  and  $F_{pa}=0.35$ . During the 2011 Arctic Fisheries Working Group (ICES AFWG, 2011), MSY reference points were proposed for NEA haddock.  $F_{msy}=0.35$  was estimated by long-term stochastic simulation, which coincided with the estimate of  $F_{pa}$ .  $B_{MSY}$  was therefore set at  $B_{pa}$ .  $B_{pa}/F_{pa}$  and  $B_{lim}/F_{lim}$  estimates were re-evaluated in 2011.

For the period from c.1950 through to c.1985 the NEA haddock SSB has only occasionally fallen below  $B_{pa}$ , most recently in the mid 1980s which coincided with a prolonged period of poor recruitment (**Error! Reference source not found.**). The SSB has been above  $B_{pa}$  since 1989, it has been increasing since 2000 and is presently at the series maximum. Fishing mortality has been around

$F_{MSY}$  since the mid-1990s. Recruitment at age 3 has been at or above average since 2000. The year classes 2004–2006 are estimated to be very strong. Surveys indicate that the year classes 2008 and 2010 are below average and 2009 year class is around average (ACOM, 2011a).



**Figure 13:** North East Arctic haddock fishing mortality rate  $F$  1950–2009 (ACOM, 2010a).

### 5.3 Management advice

Norway–Russia agreed a stock management plan–harvest control rule in 2004; this was evaluated by ICES in 2006 and modified in response to ICES advice in 2007. The current plan is based on a ‘one-year’ rule that states:

- the TAC for next year will be set at the level corresponding to  $F_{pa}$ ;
- the TAC should not be changed by more than  $\pm 25\%$  compared with the previous year’s TAC;
- if the spawning stock biomass falls below  $B_{pa}$  the procedure for establishing the TAC should be based on a fishing mortality that is reduced linearly from  $F_{pa}$  at  $B_{pa}$  to  $F = 0$  at  $SSB = \text{zero}$ . At  $SSB$  levels below  $B_{pa}$  in any of the operational years (current year and the year ahead) there should be no limitation on the year-to-year variation in TAC.

Following the most recent assessment of the fishery, stock and harvest control rule, ICES concludes that “under the present circumstances, the low probability of depleting the stock below  $B_{lim}$  and the relatively low probability of exceeding  $F_{lim}$  means that the management plan is in agreement with the precautionary approach”. ICES ACOM in 2011 based their advice on MSY levels, rather than the revised precautionary reference point levels, since  $F_{MSY}$  is equivalent to the previous  $F_{pa}$  estimate (see below). The plan is to be used until 2015 (ACOM, 2011a).

ICES noted some uncertainties within the assessment: historical bias in catch statistics due to IUU fishing - noting this was set to zero in 2009 and 2010; a lack of discarding estimates which are a known issue in trawl and longline fisheries; the reduced coverage of both Norwegian and Russian trawl surveys in 2007 and 2006 respectively - the survey indices being adjusted. In addition, they note that Norwegian sampling is believed to be less precise because of the termination of a Norwegian harbour sampling programme in mid-2009. The poor sampling caused problems in estimating Norwegian catches for the oldest ages. Overall, however, ICES has confidence in the assessment and the harvest control rule and provided the corresponding management advice for 2012. They note that the current HCR is based on  $F_{pa}$ . However, the  $F_{pa}$  value has

changed in 2011 from 0.35 to 0.47. ICES advises the continued use of the HCR with target  $F = 0.35$  (the newly estimated  $F_{MSY}$ ). This implies an  $FMP = 0.35$  in 2012, corresponding to landings of 318 000 t in 2012. This is expected to keep SSB above  $B_{pa}$  in 2013 and near the historical maximum (ACOM, 2011a).

## 6 FISHERY MANAGEMENT FRAMEWORK

### 6.1 Fishing rights, licensing etc

Following the United Nations conference on the Law of the Sea (UNCLOS) 1974-1982, coastal states, including Norway and Russia, established 200 nautical mile zones where they have jurisdiction over the natural resources. Norway established an economic zone off its mainland (1977), a fisheries protection zone around Svalbard (1978), and a fisheries zone around Jan Mayen (1980). The fisheries for NEA cod take place in the northern waters under the jurisdiction of Norway and Russia, from the mid-Norway and Northwards along the coast and into the Barents Sea.

### 6.2 Administrative Arrangements and Boundaries

An important feature of Norwegian fisheries is that most commercially significant fish stocks are shared with other countries. A comprehensive system of international arrangements for cooperation on fisheries management has therefore been developed since the introduction of 200 mile zones in the 1970's (Hoel, 2005). However, foreign vessels are not allowed to fish within Norwegian territorial waters (see Regulation 080609: Regulations amending the regulations relating to fishing and hunting operations by foreign nationals in the Economic Zone of Norway and landings in Norwegian ports).

The point of departure for the annual international negotiations on TAC for different stocks and species, and hence also coastal fisheries management, is the scientific advice provided by the International Council for the Exploration of the Sea (ICES). ICES is the regional body for cooperation on marine science in the North Atlantic.<sup>1</sup> ICES advice, which comes in the format of options for TACs with specified consequences in terms of stock development in ensuing years, is developed in a comprehensive process where the Institute of Marine Research (IMR) plays an important role for stocks relevant to Norway. Indeed, the on-going continuous work in the IMR and collaborating scientific institutions in Norway, as well as other countries, provides the scientific advice that feeds into the preparations for and actual international negotiations on TAC levels. These take place under a number of bilateral and multilateral agreements between Norway and other countries.<sup>2</sup> In the case of cod and haddock, the TAC levels are decided in the Norway-Russia Fisheries Commission.

The IMR is an independent research institution with its own board. About half of its funding comes from the Ministry of Fisheries and Coastal Affairs. The mission of the IMR is to collect the data and develop models to provide scientific analysis and advice on the management of fish stocks in Norwegian waters. These activities are funded directly by the ministry.

The knowledge base for resource management is developed by the IMR in Norway and PINRO in Russia, who have a long-standing cooperation in data collection, including annual joint research cruises, and the development of assessment models (Hoel, 2008). Norwegian and Russian scientists meet annually to discuss research and environmental and resource management throughout the Barents Sea. There are annual joint research cruises and resource surveys. The work of IMR and PINRO is thus the basis for the scientific advice for resource management to the Norway-Russia Fisheries Commission provided by ICES. These scientists also participate in the Arctic Fisheries Working Group convened each year by ICES. ICES also provides for international peer-

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<sup>1</sup> See: <http://www.ices.dk/aboutus/aboutus.asp>

<sup>2</sup> The last is Stortingsmelding nr 45 (2008 – 2009) Om dei fiskerivtalane Noreg har inngått med andre land for 2009 og fisket etter avtalane i 2007 og 2008.

review of the scientific work used in stock assessment. Additional scientific inputs on stock assessment and marine ecosystems are provided also by other research institutions, such as universities and other research institutes. The IMR also plays an important role in communicating science to the fishing industry. Communication takes place through various media: the web, newspapers, and participation in meetings in the industry.

The formal responsibility of the Norway-Russia Fishery Commission is to recommend TACs on the shared fish stocks to the fisheries authorities in Norway and Russia. In Norway, the overall responsibility for resource management resides with the Ministry of Fisheries and Coastal Affairs, while the Fisheries Directorate, located in Bergen, is a technical body.

The Ministry of Fisheries and Coastal Affairs is responsible for all management of living marine resources in waters under Norwegian jurisdiction. The minister of fisheries is constitutionally responsible to the Storting (Parliament) in these matters. The ministry sets the policy for fisheries through reports to the parliament (“Stortingsmelding”), budgetary decisions, and development of legislation.

The detailed work of developing regulations and implementing them after their approval by the Minister is the chief task of the Fisheries Directorate, which was established in 1900. The regulatory tradition is therefore very long in Norwegian fisheries (Nordstrand, 2000). The Directorate plays a key role in formulating the proposal for regulations and consulting with industry interests and others in this. The Directorate, with some 430 employees, works on all aspects of fisheries and aquaculture management, as well as coastal zone management. It is organized in seven regions with 29 offices<sup>3</sup> along the 21,000 kilometre long coast of Norway.<sup>4</sup> The Directorate also plays an important role in the enforcement of fisheries regulations. The Bergen office collects all fisheries statistics and is home to a centre for satellite surveillance of the fishing fleet.

The Fisheries Directorate also has an information function, to inform and advise fishers on the regulations of the industry. All regulations are published in real time as they come into effect at the web site of the directorate,<sup>5</sup> on national public radio (NRK), and in the industry newspaper “Fiskeribladet Fiskaren”. As knowledge on regulations is critical business information, vessel owners and skippers have a strong interest in being up-to date on this information, and usually are very well informed about current rules and regulations.

The annual decision-making cycle for the management of fisheries involves a number of actors and arenas at the domestic and international levels (Figure 14). The outcome of each annual cycle is a set of decisions on regulations of fisheries for the following year.

The outcome of these negotiations is then the basis for the development in the Fisheries Directorate of proposals for the detailed regulatory arrangements for the following year. These proposals, which contain detailed reviews of previous years’ regulations, experiences with these, and proposals for new regulations,<sup>6</sup> are subject to discussion in the Regulatory meeting, the main arena for consultation with the industry and other stakeholders (see below). These proposals are in the public domain at the

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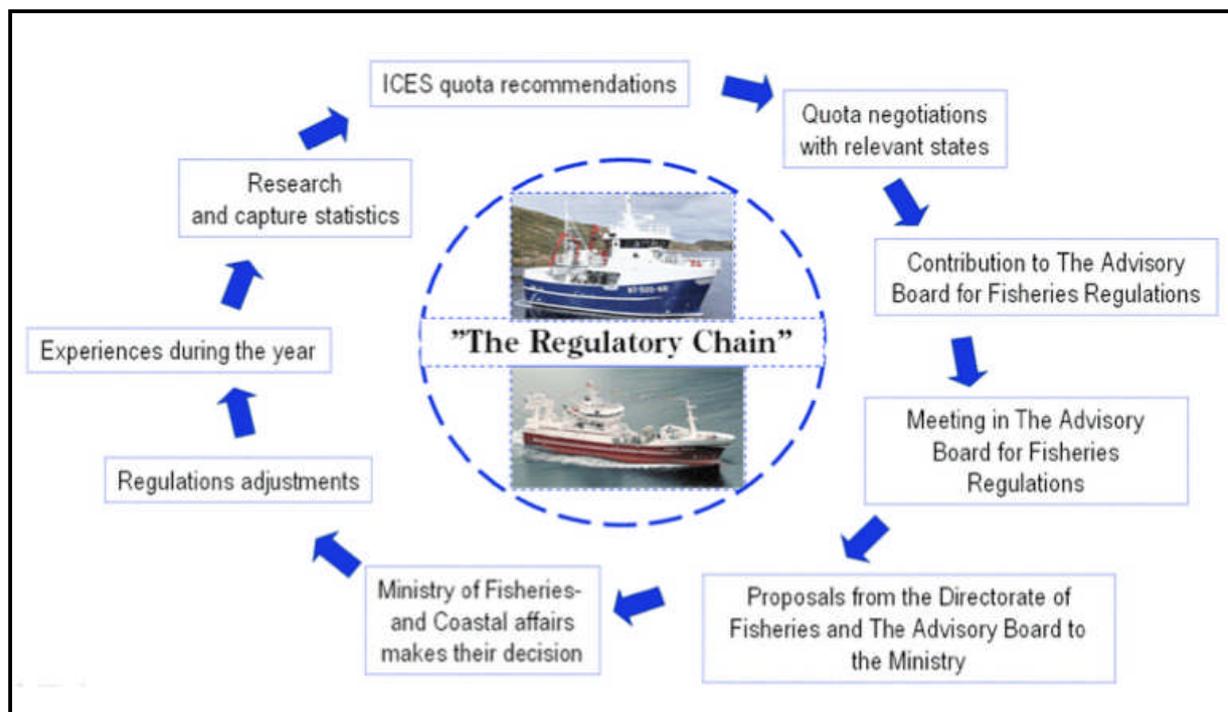
<sup>3</sup> 7 regional offices in Vadsø, Tromsø, Bodø, Trondheim, Ålesund, Måløy and Egersund and 22 local offices.

<sup>4</sup> Fisheries Directorate, undated, Livet i havet – vårt felles ansvar. Roller og oppgaver i havressurs- og akvakulturforvaltningen. At: <http://www.fiskeridir.no/fiskeridir/statistikk-og-fakta/publikasjoner-brosjyrer>. Accessed 12 April 2009.

<sup>5</sup> <http://www.fiskeridir.no/fiskeridir/fiske-og-fangst>

<sup>6</sup> The most recent for cod fisheries (reviewing the experience with regulatory arrangements for 2009) Sak 2/09 Utviklingen i de enkelte fiskerier i 2009. Fisheries directorate web site: <http://www.fiskeridir.no/fiskeridir/fiske-og-fangst/sakspapirer-referater/reguleringsmoetet-18.-juni-2009>. This document will be followed up with proposals for 2010 regulations in the December meeting 2009.

website Web site of the Fisheries Directorate.<sup>7</sup> Figure 2 illustrates the annual cycle of decision-making in fisheries management.



**Figure 14:** The annual decision-making cycle. Source: The Ministry of Fisheries and Coastal Affairs

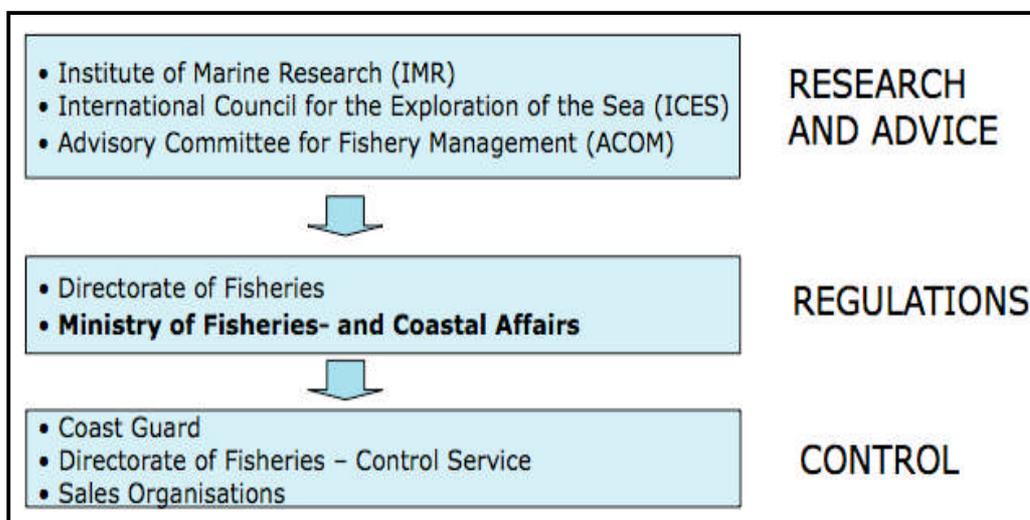
The Ministry and the Directorate have a well developed and institutionalized annual cycle of cooperation with regular meetings. The Ministry provides instructions to the directorate regarding tasks to be performed and provides the funding for it. A key document for the Ministry's governance of the directorate is the annual state budget and a follow up letter ("tildelingsbrev") that specifies budget allocations on tasks. There are plans documents detailing how the cooperation is organized and take place, which are regularly updated and subject to discussion in annual meetings. The Director of the directorate is responsible and reports to the minister. There is also close cooperation at the level of departments within the ministry and within the directorate which addresses specific issues.

As regards the relationship between the Ministry and the IMR, the Ministry and the IMR have an annual cycle of cooperation with regular coordinating meetings, planning and reporting. A critical document is the annual state budget and a follow up letter ("tildelingsbrev") detailing the tasks that the ministry wants the institute to do that particular year in return for ministry funding. The Fisheries Directorate is represented on the board of the IMR. There is also a close day-to-day cooperation between the IMR and the directorate.

In sum, organizations, management responsibilities and interactions are clearly defined within the three core areas of resource management: developing the knowledge base, preparing and implementing regulations, and enforcing them. The interactions between the Ministry, Directorate

<sup>7</sup> See the web site of the Fisheries directorate: <http://www.fiskeridir.no/fiskeridir/fiske-og-fangst/sakspapirer-referater>

and IMR function well. Divisions of responsibility are clear-cut, with the Ministry being politically responsible and the directorate performing the technical work at the behest of the Ministry (Figure 15). Decision-making procedures are well established and allow for expeditious and effective interactions. There is an established, tested and proven annual decision-making cycle resulting in regulatory arrangements for the following year.



**Figure 15:** Actors and roles in Norwegian fisheries management. Source: Ministry of Fisheries and Coastal Affairs

### 6.3 Legislation and Regulation

Most of Norway's fisheries, including NEA cod and haddock that are shared with Russia, are based on stocks that are shared with other countries. However, as noted earlier, foreign vessels are not allowed to fish within Norwegian territorial waters (see Regulation 080609: Regulations amending the regulations relating to fishing and hunting operations by foreign nationals in the Economic Zone of Norway and landings in Norwegian ports).

The domestic fisheries legislation has evolved over time as a response to the developments in the industry and the need to regulate resource use, on the one hand, and in response to the developments in international ocean law and politics on the other. The growing complexity of fisheries, a need to streamline and modernize legislation, and increasing environmental awareness led to the establishment of a committee in 2003 to develop more modern ocean resources legislation. The committee submitted a draft of a new oceans resources law in 2005 (Nou, 2005). The new law – the “Ocean Resources Act” - was adopted by the Parliament in May 2008.<sup>8</sup>

The new act incorporates the earlier basic legislation for regulation of Norwegian fisheries, the 1983 Saltwater Fisheries Act.<sup>9</sup> In addition, the 1999 Act on Participation in fisheries<sup>10</sup> deals with restrictions on access to fisheries, and is the basis for a number of licensing arrangements. The Ocean Resources act provides the legal basis for quota regulations and various technical regulations. The act also sets out the decision-making procedures for fisheries management and the legal basis for the enforcement of regulations.

<sup>8</sup> Ot.prp. nr. 20 (2007-2008) Om lov om forvaltning av villtlevende marine ressurser (havressurslova).

<sup>9</sup> Act of 3 June 1983 No 40 on Salt Water Fisheries.

<sup>10</sup> Act of 26 March 1999 No 15 concerning the right to participate in fisheries and hunting

The new act represents a modernization of fisheries legislation that also incorporates recent developments in relevant international law. Its chief objective is to “ensure sustainable and economically profitable management of wild living marine resources and genetic material derived from them, and to promote employment and settlement in coastal communities.”<sup>11</sup> Specifically, the act lists the following principles and considerations as important in resource management:<sup>12</sup>

- a) a precautionary approach, in accordance with international agreements and guidelines,
- b) an ecosystem approach that takes into account habitats and biodiversity,
- c) effective control of harvesting and other forms of utilisation of resources,
- d) appropriate allocation of resources, which among other things can help to ensure employment and maintain settlement in coastal communities,
- e) optimal utilisation of resources, adapted to marine value creation, markets and industries,
- f) ensuring that harvesting methods and the way gear is used take into account the need to reduce possible negative impacts on living marine resources,
- g) ensuring that management measures help to maintain the material basis for Sami culture.

The need to take environmental concerns into account is an important aspect of the law, which specifically mandates the use of the precautionary approach and the ecosystem approach to the management of living marine resources. The objectives of legislation are generally to provide the legal basis for the resources to be managed in a sustainable and responsible manner, to control and limit the access to fisheries in order to reduce overcapacity, and to enhance the economic efficiency of the industry.

Also, a number of other laws are relevant to the regulation of fisheries, including the Economic Zone act,<sup>13</sup> and the Raw Fish Sales Act of 29 June 1951 No 31. The former provides the basis for Norwegian jurisdiction over fisheries. The latter sets up raw fish sales organizations controlled by fishers, which play an important role in regulating the execution of a fishery and in the control of landings (see below).

The actual regulations of fisheries are contained in secondary legislation that is regularly updated by the Government (cfr process described above) and communicated to the industry through newspapers, national public radio, the web and through the industry’s organizations.

An important distinction is between *access* regulations specifying criteria for permission to participate in a fishery, *output* regulations that deals with the amount of fish that can be caught, and *technical* regulations specifying how a given fishery shall be executed.<sup>14</sup> Some regulations are generic and pertain to all Norwegian waters and/or to all Norwegian fishing vessels flying the Norwegian flag. Other regulations are limited to certain geographic areas, gear types and fisheries.

The complexity of the regulatory system and the regulations is a consequence of the complexity of the activity to be regulated: some 20 fish stocks are exploited commercially at a substantial scale,<sup>15</sup> by some 7000 Norwegian fishing vessels (full or part time). The oceans under Norwegian jurisdiction are about 2.2 million square kilometres, about six times the land area, and the coastline is 21,000 kilometres.

Regulations generally provides for the authorities (the Directorate) to stop a fishery when the quota is

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<sup>11</sup> Translation from Norwegian provided by the Ministry of Fisheries and Coastal Affairs, 2009.

<sup>12</sup> Section 7, Ocean Resources Act.

<sup>13</sup> Act of 17 December 1976 No 91 on Norway’s Economic Zone

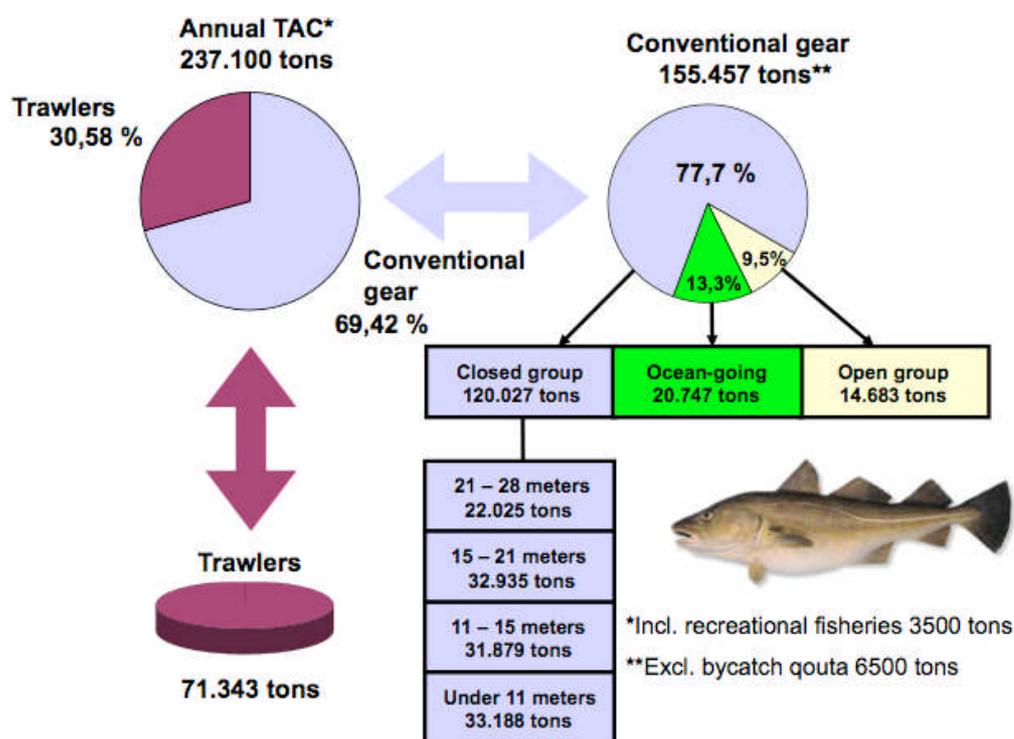
<sup>14</sup> Stortingsmelding nr 51 (1997-1998) Perspektiver på utvikling av norsk fiskerinæring.

<sup>15</sup> ref

taken, and to modify the regulations so as to ensure their rational and appropriate execution. Catches and landings are monitored through a system that encompasses all commercial fisheries. Regulations also set out rules for penalties that apply in case of violation of regulations.

Access regulations: most vessels hold a number of licenses/permits and participate in a number of fisheries. Almost all Norwegian fisheries are now closed in the sense that the access to them is regulated by licenses and permits. An important distinction is between licenses with no time restrictions, and annual permits to participate in a fishery. The former usually applies to larger vessels, while vessels fishing with conventional gears have their participation in a fishery regulated by annual permits that are renewed each year as long as there is a fishery and the permit holder has not violated the conditions it is granted on.

Output regulations in the form of fish quotas basically establish that fishing for a given fish stock is prohibited, except for those vessel groups that have explicit permission to fish. They give the total quota available to Norwegian vessels and the area the quota is to be taken in, and provide for detailed arrangements for how the quota is to be shared among participants in the fishery. Figure 16 shows the arrangement for allocation of NEA cod on the various vessel groups (defined by gear and length) participating in the fishery. Similar arrangements exist for most fisheries in Norway including haddock.



**Figure 16:** Quota allocations for haddock 2009. Source: Ministry of Fisheries and Coastal Affairs

The haddock fishery has been quota regulated since the mid-1970s. The trawl fleet has been subject to vessel quota management since 1978 and the conventional gear fleet has been subject to vessel quotas since 1989. The figure shows the vessel groups allowed to participate in the NEA cod fishery, and the same distributional arrangement applies to the haddock fisheries, divided into two main regulatory groups; trawlers and conventional gears. As for cod, the total Norwegian quota (95,050 tons) is split between these two groups on the basis of a fixed formula, which for 2009 gives trawlers

(36,119 tons which is 38%) and conventional gears (58,931 tons which equates to 62%). The conventional group, in turn, is further divided into three groups: a “closed” group with vessel quotas (46,609 tons in 2009), an “open” group (typically small scale, part time operators) with maximum quotas for each vessel (4,714 tons in 2009), and a group of ocean-going vessels fishing with conventional gears (10,608 tons (18%) in 2009).<sup>16</sup>

The distinction between trawlers and vessels fishing with conventional gears is often referred to as trawlers vs coastal vessels, but the latter group contains many vessels that are ocean going. The conventional gears group includes vessels of all lengths, fishing with nets, Danish seine, handline and longline.

Technical regulations are since 2004 collected into one, omnibus regulation.<sup>17</sup> They include provisions for mesh size design and mesh size in trawls, restrictions on areas where such gears can be used, regulations concerning the construction of trawls and their use, restrictions on the use of conventional gear (purse seines, gill nets, longline and pots), bycatch regulations, minimum sizes, etc.

Discards and release of catches that are dead or dying is prohibited, and detailed in a list of species that is expanded to include virtually all species (around 60) caught in Norwegian waters from 2009 onwards. The Norwegian discard ban is in reality a requirement to land all catches, as all catch taken on board has to be landed.

For all groups of vessels, the regulations also include provisions on by-catch. For most fisheries, a certain amount of by-catch is permitted, and counted against the quota for the species/stock in question. A number of measures are introduced to reduce by-catch, including selective gear and closure of areas with undersize fish.

Technical regulations also include a number of closed areas and areas where special regulations apply. Permanently closed areas are in force to protect corals, key areas of which (as noted elsewhere in this document) are within inshore waters.<sup>18</sup> Also, new regulations to protect vulnerable bottom habitats in waters under Norwegian jurisdiction are now being prepared, and are currently in hearing with the industry and other stakeholders.<sup>19</sup>

An important regulatory measure relating to sea-water fisheries in Norwegian waters, which apply to waters under Norwegian fisheries jurisdiction, is the system of flexible opening and closure of fishing grounds. A fisheries surveillance service follows the fisheries at sea, and when the incidence of undersized fish is too high, an area is closed for fishing (and re-opened again when the size composition of catches are acceptable, as monitored for example through the reference fleet). Given that coast guard effort is focused on the offshore fleet, these closures will be less frequent for the inshore fleet.

Still another area-based regulation is the requirement for larger vessels and trawlers to fish outside the fjord-lines and/or the 4mile line (depending on vessel size and gear type). Trawlers generally have to fish outside 6 miles and/or 12 miles. This provision is however subject to seasonal and regional variation in complex zonal arrangements, where wet fish trawlers in limited localities can be allowed to fish in to 4 nautical miles from the baselines (arrangement possibly discontinued from next year), while trawlers in general are not allowed to fish in zones between 6 and 12 nautical miles as part of vessel group separation. Factory trawlers are not allowed inside 12 miles.

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<sup>16</sup> Information given in meeting with the Ministry of Fisheries and Coastal Affairs 18 February 2009.

<sup>17</sup> Forskrift av 22. Desember 2004 nr 1878, updated annually.

<sup>18</sup> Section 13 of the Regulations amending the regulations relating to sea-water fisheries, dated 17 March 2009.

<sup>19</sup> <http://www.regjeringen.no/nb/dep/fkd/aktuelt/nyheter/2009/horing--nytt-regelverk-for-a-beskytte-sa.html?id=570994>

There is a general prohibition on the use of explosives in fisheries.<sup>20</sup>

Measures against ghost fishing have been expanded over time. The most recent amendments of the regulation includes a duty to search for lost gear, and a duty to report lost gear.

Ecosystems-based oceans management is introduced in Norway through designated management plans for larger ocean areas (Kroepelien, 2007). The Management Plan for the Barents Sea was adopted in 2006, and will be reviewed in 2010. Adopted by the Parliament,<sup>21</sup> it and essentially provides for a zonal arrangement where petroleum-related activities are prohibited in certain areas and periods to protect fisheries and ecosystems. A management plan for the Norwegian Sea was adopted in 2009.<sup>22</sup>

Ecosystem-based fisheries management is also in the process of being introduced, and many of the measures described here are part of an ecosystem-based approach to fisheries management where a key issue is to minimize the impact of fisheries on the marine environment. This pertains to the area-based regulatory measures in particular.

The Raw Fish Act and the Salt Water Fisheries Act provides for an important role for the sales organizations in regulating fisheries. This is justified on the need for a rational execution of a fishery, and by way of secondary legislation the sales organizations can for example establish weekly quotas for a given fishery, in order to prevent that too much is being fished in too short a time. The fish should remain in the ocean until there is capacity on shore to handle it.

Regulations are established on an annual basis. In addition to the quota regulations, the fishery is regulated by a minimum catch size (44 cm), a minimum mesh size in trawls and Danish seines (135 mm plus 55 mm sorting grid in Norwegian sector; 125 mm plus 55 mm sorting grid in Russian sector). Also, in the Norwegian sector there is a maximum permitted by-catch (15%) of undersized fish, and closure of areas having high densities of juveniles as well as seasonal and area restrictions.

For all groups the regulations also specifies rules for calculation of a vessel's quota in case of replacement or modification of a vessel, in order to keep capacity development in the fleet under control. This system has contributed to a substantial reduction in the number of vessels in the fleet over time.<sup>23</sup>

In summary, Norwegian fisheries legislation and regulations are comprehensive and covers all aspects of the industry's activity at sea. With the adoption of the new Ocean Resources Act, a very modern approach to resource management in line with recent developments in international law, emphasizing ecosystems-based management of living marine resources, is in place.

#### *Coastal cod*

ICES advice states that the distributional area of coastal cod is inside of the 12 nm limit of the Norwegian statistical areas 03, 04, 05, 00, 06, 07 (<http://www.ices.dk/reports/ACOM/2008/AFWG/Sec->

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<sup>20</sup> Salt water fisheries act para 24).

<sup>21</sup> Stortingsmelding nr 8 (2005 – 2006) Helhetlig forvaltning av det marine miljø i Barentshavet og havområdene utenfor Lofoten (forvaltningsplan), Ministry of Environment, Oslo.

<sup>22</sup> Report No 37 (2008-2009) to the Storting: Integrated Management of the Marine Environment of the Norwegian Sea. Ministry of the Environment, Oslo.

<http://www.regjeringen.no/nb/dep/md/dok/regpubl/stmeld.html?id=701>

<sup>23</sup> The number of vessels in Norwegian fisheries has been halved in a little more than a decade, from 14000 vessels in 1995 to 7000 2007. <http://www.fiskeridir.no/fiskeridir/statistikk/fiskeri/fiskere-fartoy-og-tillatelser/opplysninger-om-fartoy-fra-merkeregisteret>

[02%20Cod%20in%20subareas%20I%20and%20II.pdf](#), Section 2.1). The fisheries under assessment here are therefore expected to catch coastal cod, potentially at levels which would affect recovery or rebuilding of the coastal cod stocks.

The scientific advice from ICES regarding coastal cod is zero quotas (ACOM, 2010b); “The 2009 data do not change the perception of the stock and give no reason to change the advice from that given last year: Given the low SSB and recruitment for this stock, no catch should be taken from this stock in 2011 and a recovery plan should be developed and implemented.” If this were to be followed up upon, the fisheries in coastal areas from Nord-Møre northwards would have to be closed.<sup>24</sup> To cope with the situation, a group with representatives from the industry and the authorities has been working for over 5 years to develop an approach to limit fishing pressure on coastal cod. The regulatory approach involves shifting the activity of larger vessel groups away from the coast and from particular areas in Lofoten (Henningsvær box) and in Borgundfjord. Regulations have been gradually strengthened and expanded, and there are now small signs of improvement in the stock.<sup>25</sup> Regulatory measures to protect coastal cod now include a prohibition against the use of Danish seine inside the fjord lines to the north of 62 degrees north, vessels above 15 metres have to fish outside the fjord lines, fishing with pelagic nets is limited to certain periods, by-catch regulations, and limits on recreational fisheries.<sup>26</sup> These measures were expanded in 2009, so that the complete list of measures include<sup>27</sup>:

- Previous year’s fjord lines (fjord protection zones) are maintained with the exception of a fjord line at Møre, which is moved to the outer side of Nordøyane in Haram<sup>28</sup>.
- The prohibition against fishing for cod inside fjord lines using vessels over 15 metres is sustained.
- Fishing with Danish seines inside fjord lines is prohibited year-round. (Danish seine vessels under 15 metres are no longer allowed to fish for species other than cod from 15 May and for the rest of the year.)
- Access for fishing for flounder inside fjord lines from 15 May and for the rest of the year using Danish seines depending on the length of the vessel – is revoked.
- The prohibition against fishing with pelagic nets inside fjord lines is sustained, but limited to the period from 1 February – 30 June (in 2008, prohibited for the first six months).
- The decision to perhaps increase the minimum mesh size for nets used to fish for cod inside fjord lines is postponed until the consequences have been reported on in more detail.
- The prohibition against more than a 5% bycatch of cod while fishing for other species inside fjord lines is sustained.
- The prohibition against vessels over 21 metres fishing for cod with conventional gear within the baseline is sustained. From and including 1 January to and including 30 June, fishing is permitted close to fjord lines in statistical areas 03 and 04. From and including 1 January to and including 10 April, fishing is permitted close to fjord lines in statistical areas 00, 05, 06

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<sup>24</sup> Peter Gullestad, meeting with Fisheries Directorate 10 February 2009.

<sup>25</sup> Ministry of Fisheries and Coastal Affairs pers. Comm.. 18 February 2009.

<sup>26</sup> <http://www.regjeringen.no/en/dep/fkd/Press-Centre/Press-releases/2008/protective-measures-for-norwegian-coasta.html?id=541147>

<sup>27</sup> <http://www.regjeringen.no/nb/dep/fkd/pressesenter/pressemeldinger/2008/vernetiltak-for-norsk-kysttorsk-i-2009.html?id=541147>

<sup>28</sup> for charts, see <http://www.fiskeridir.no/content/download/18129/153143/version/1/file/kysttorsk-2010-fjordlinjer.pdf>

and 07. Fishing up to fjord lines in the Lofoten fishery inspection district during this period and in the areas that are under the authority of the Lofoten fishery inspection is permitted.

- The prohibition against more than a 20% bycatch of cod when fishing for other species between the baselines and the fjord lines during the period in which fishing for cod is prohibited for vessels over 21 metres in this area, cf. item above, is sustained.
- The specially protected area at Henningsvær that is closed to fishing from and including 1 January to and including 30 June is sustained. The prohibition does not apply to fishing with hand-held fishing lines or fishing rods. The Directorate of Fisheries can make exceptions to the prohibition for vessels that fish with conventional gear other than Danish seines or pelagic nets if sufficiently large concentrations of spawning cod are found in the area. The Directorate of Fisheries can decide that such exceptions shall only apply to vessels under 15 metres. Opening of the area during the fishing season for spawning cod is based on mapping and sample-taking. The outer limits of the area shall be fjord lines in the case of an opening during the fishing season for spawning cod and during the second six months.
- The Directorate of Fisheries can limit or prohibit all fishing, including for species other than cod, haddock and saithe, in an area between Henningsvær and Stamsund if this is necessary to protect coastal cod. Such a prohibition shall not prevent fishing with hand-held fishing lines or fishing rods. The Directorate of Fisheries may further limit or prohibit fishing for cod inside the fjord lines of the Valberg fishing grounds at Henningsvær in the case of dominant occurrences of coastal cod. Furthermore, the Directorate of Fisheries may, in the same area, permit fishing for vessels larger than 15 metres if there are large concentrations of spawning cod.
- The Borgund fjord is declared a specially protected area where all fishing from and including 1 March to and including 30 April is prohibited – including fishing for species other than cod, haddock and saithe. However, the prohibition does not apply to fishing with hand-held fishing lines or fishing rods. The Directorate of Fisheries can make exceptions to the prohibition for vessels that fish with conventional gear other than Danish seines or pelagic nets if there are significant concentrations of spawning cod in the area.
- In Heissa fjord it is prohibited to fish with pole nets from 1 March to 30 April in an area east of a given line – see the map attached.
- Fishing inside the 12 mile limit shall cease for Easter from 9 to 13 April.
- There is a continuation of the current marine divisions, including the prohibition against trawling within 6 nautical miles with the exception of certain vessels that from 1 April to and including 30 September can trawl for argentinies within 4 nautical miles of the baseline between 64°00'N and 67°10'N, and of freshwater fishing trawlers that from and including 15 April to and including 30 September can fish by trawling in three more specifically limited areas on the coast of East Finnmark.
- The export quota scheme of 15 kg of fish or fish products per person, and one whole trophy fish is sustained.
- Recreational fishermen's opportunity to fish for commerce is limited upwards to the sum that is set in § 29 of the Act relating to value added tax (up to NOK 50,000) cf. the Marine Resources Act. An upper limit of 2000 kg of cod for commerce is nonetheless maintained per participant and per vessel for recreational fishermen. Note that the limit of 2000 kg per vessel applies no matter how many persons are using the vessel.

- Guidelines shall be established for landing notes and contract notes for catches that are taken inside or outside fjord lines, and also inside/outside baselines and 4 mile limits.

These were subsequently expanded in September 2010<sup>29</sup> to include:

- Minimum catch size for cod is set to 44 cm in the area north of 62°N. Take effect from 2011.
- Minimum catch size for haddock is set to 40 cm in the area north of 62°N. Take effect from 2011.
- The general prohibition of fishing with Danish seine inside fjord lines is continued, with the exception of trawling vessels below 11 metres, fishing for flatfish and hake inside fjord lines. Applies in the period between 1<sup>st</sup> of June until 31<sup>st</sup> of December.
- Fresh fish trawlers is deprived of the former right to fish between 4 and 6 nm (as per September 2010)
- Fishing brisling and herring with light is prohibited. If the vessels are accompanied by observers, they can be excused from the prohibition as a part of research.
- South of 62°N minimum mesh width is set to 126 mm. Take effect from 2012.
- In recreation fishing the maximum amount of fishing net is reduced from 210 metres to 165 metres. Take effect from 2011.
- The recreational fishers right to fish cod for commercial purpose is limited to 1000 kg per fisherman and per vessel. From 2011.
- The Norwegian Directorate of Fisheries is considering possible measures in the trawling for crawfish.
- The establishment of fjord lines in the south are prepared. Intended implementation from 2012.
- The Directorate of Fisheries are asked to intensify the work on defining suitable marine protected areas, with intended implementation from 2011.
- Sorting grids in the scrimp fisheries in the south are required. The opportunity to use collecting cages are considered in relation to the harmonization of the technical regulations for the areas of Skagerrak and the North Sea.
- Additional measures are considered as updated advice and stock assessments are provided from the International Council for Exploration of the Sea (ICES).

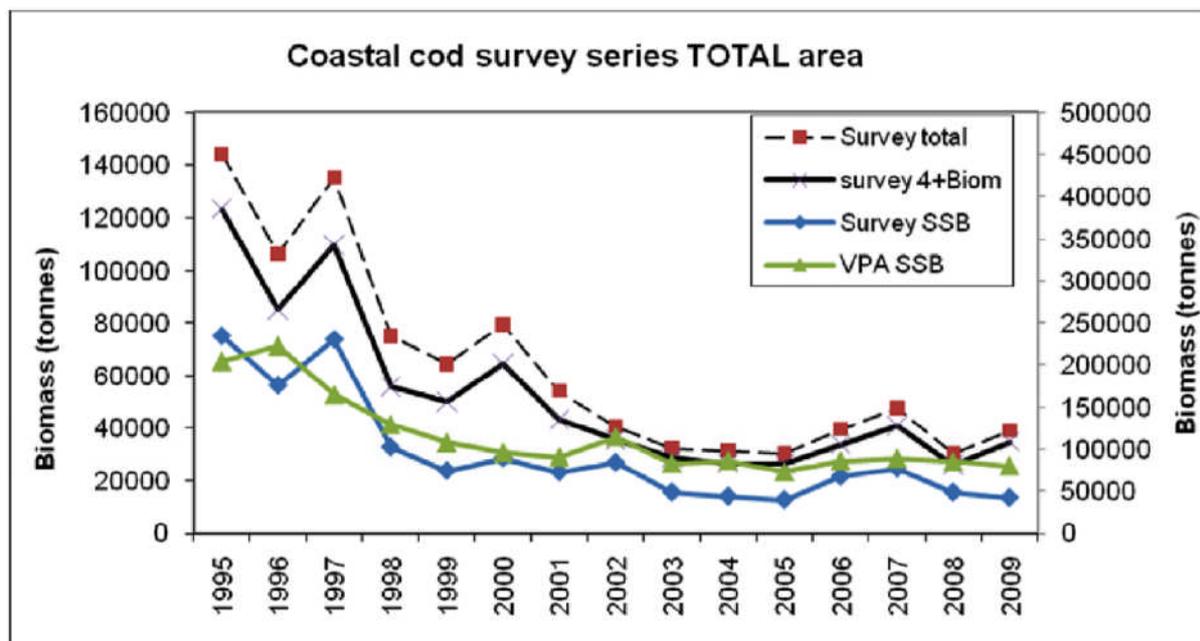
The Ministry also asked the IMR to initiate work on a rebuilding (management) plan for coastal cod, and requested that this plan be evaluated by ICES (Royal Ministry of Fisheries and Coastal Affairs, 2010; ACOM, 2010c). The plan notes:

“The overarching aim is to rebuild the stock complex to full reproductive capacity, as well as to give sufficient protection to local stock components. Until a biologically founded rebuilding target is defined, the stock complex will only be regarded as restored when the survey index of spawning stock in two successive years is observed to be above 60 000 tons (the average survey index in the years 1995-1998; see Figure 17). The actual status of coastal cod in 1995-1998 relative to sustainable reference levels is not clear. Importantly, therefore, this rebuilding target will be redefined on the

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<sup>29</sup> <http://www.regjeringen.no/nb/dep/fkd/pressesenter/pressemeldinger/2010/endra-vernetiltak-for-kysttorsk-i-2010.html?id=613460>

basis of relevant scientific information. Such information could, for instance, include a reliable stock assessment, as well as an estimate of the spawning stock corresponding to full reproductive capacity.



**Figure 17.** Different biomass estimates from the Norwegian coastal survey: Total biomass, biomass of individuals aged 4+, and spawning stock biomass (left axis). Also the SSB from the XSA assessment (right axis).

Given that the survey index for SSB does not increase, the regulations will aim to reduce  $F_{4.7}$  by at least 15 per cent annually compared to the  $F$  estimated for 2009. If, however, the latest survey index of SSB is higher than the preceding one - or if the estimated  $F$  for the latest catch year is less than 0.1 - the regulations will be unchanged.

Special regulatory measures for local stock components will be viewed in the context of scientific advice. A system with stricter regulations inside fjords than outside fjords is currently in operation, and this particular system is likely to be continued in the future.

The management regime employed is aiming for improved ecosystem monitoring in order to understand and possibly enhance the survival of coastal cod. Potential predators are - among others - cormorants, seals and saithe.

When the rebuilding target is reached, a thorough management plan is essential. In this regard, the aim will be to keep full reproductive capacity and high long-term yield.”

ICES also notes: “At present, there are several regulatory measures employed. Importantly, the commercial catches of coastal cod are currently taken by vessels that have quotas of Northeast Arctic cod, whereby a small quantity has been added to their quota to cover the expected by-catch of coastal cod. Second, the core regulation strategy used to reduce catches of coastal cod has been to restrict parts of the fleet to areas and seasons where they are most likely to catch Northeast Arctic cod. Third, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines. Fourth, long-liners fishing with automatic baiting have to fish outside 4 nautical miles (nm), whereas trawlers have to fish outside 12 nm (6nm in some places). Similarly, vessels fishing with Danish seine have to fish outside the fjord lines. Fifth, two coastal cod spawning

areas have - in the spawning season - been closed for fishing, except for fishing with hand lines. Finally, some restrictions to the recreational fishery have also been introduced.

All the aforementioned regulation measures can potentially be employed to further restrict catches of coastal cod. In addition to these measures, a principle of increased mesh size can be introduced in coastal areas. This will improve the likeliness of survival to age of spawning, and further, the survival of second time spawning.

Due to the complexity of these fisheries and the variable mixing between Northeast Arctic cod/haddock and coastal cod, the exact annual effect of gradually increased regulations has proved difficult to predict. The accumulated effects over several years should, however, be expected to be in line with the above rebuilding plan.”

ICES response to the recovery plan proposal (ACOM, 2010c) notes “As recognised in the request there are uncertainties related to the analytical assessment of the coastal cod stock complex. Therefore more work is needed to obtain reliable reference points like the biomass corresponding to full reproduction potential and the  $F$  corresponding to high long term yield. The available biological data were considered sufficient for coarse simulations of the effects of the proposed rebuilding plan and for evaluating the extent to which the plan is precautionary. The robustness against uncertainty in survey results and uncertainty in the realised effects of regulations has been explored.

ICES notes that reduce  $F$  by at least 15% annually compared to the  $F$  estimated in 2009 can be interpreted in two ways: fixed steps or gradual reductions. The latest (15% relative to the latest reduction) would lead, after some years, to micro steps that are unrealistic compared to the precision of the surveys and the stock assessment. Therefore, ICES used fixed steps to reduce  $F_{2009}$  to the lower limit ( $F=0.1$ ).

With an  $F_{2009}=0.3$ , the total time span to reach the lower  $F$  limit will be 5 or more years.

**Based on simulations, ICES concludes that the plan, if fully implemented, is expected to lead to significant rebuilding. Nonetheless, accounting for realistic uncertainties in the catches, surveys, and the assessment model, a rather long rebuilding period is required even if fishing mortality is markedly reduced within the next several years. Whilst not fully quantifiable, the needed reductions in fishing mortality will require accompanying reductions in the catches.**

**ICES considers the proposed rule to be provisionally consistent with the Precautionary Approach. The basis of this evaluation is the precautionary approach, and not the new ICES MSY framework. However, it is anticipated that ongoing work will provide a basis for revisiting the consistency of the proposed rule with the ICES MSY framework in the next year or two.**

**ICES notes that there is no basis at present for deriving absolute estimates of  $F_{msy}$ . However, it is likely that the current  $F$  is above any candidate values of  $F_{msy}$  and the plan therefore represents a step towards MSY.**

Increasing the  $F$  step, or aiming for annual  $F$  reductions irrespective of the survey results during the first 3 5 years, will contribute to faster and more certain rebuilding.

If future observations show that recruitment declines stronger than assumed in the current stock-recruit model, the plan may need revisions.

Recreational fisheries have a significant impact on the stock, and further regulations should be

implemented to obtain the F-reductions specified in the plan.

The stock complex is not fully understood and therefore local depletion should be guarded against. Hence, current regulations aimed at protecting local stock components should be maintained.

In the simulations and analyses conducted, no direct attempts were made to take account of the stock complexity. Genetic studies indicate that the cod in some fjords could be separate stocks isolated from neighbouring stocks. An assessment of the combined stocks is not likely to detect fluctuations of the smaller components, and thereby the current assessment approach involves some risk to local stocks. The stock complex is still not fully mapped, but the existence of local stocks calls for special attention in protecting genetic diversity. Although genetic differentiation between cod in different embayment and fjords has not been demonstrated, consideration should be given to conservation measures to prevent further depletion or eradication of local groups of coastal cod. Full monitoring and research on small local stocks requires large efforts and may not be realistic. A possible approach could be to obtain information from local fisheries and look for data that could be appropriate indicators for detecting sharp declines in local stocks. The established strategy of more strict regulations inside the fjords than outside should be continued.

A fixed natural mortality of  $M=0.2$  was used both in the assessment and the simulations. Some fjord studies indicate that the main predators on young cod are larger cod, cormorants and saithe. However, there are no estimates of annual predation mortality on the stock complex, thus predation mortality was not taken into account in any of the analyses or simulations. Reduced predator stocks may enhance the rebuilding of cod, while an increase of predators may inhibit the process and require more stringent regulations to achieve the rebuilding target.”

#### **6.4 Monitoring, Control and Surveillance**

The enforcement of fisheries regulations is the responsibility of the Coast Guard (at sea), the Fisheries Directorate (near-shore waters and upon landings) and the fish sales organizations (upon landing). In addition, also local police, tax- and customs authorities are involved when required. These organizations have established procedures governing joint activities and regularly meet to coordinate actions.

The activities of these agencies are based on *risk analysis*, which implies the strategic deployment of enforcement resources where they are considered most effective in terms of improvement of the control of fisheries activities. Enforcement resources are prioritized to fisheries where the likelihood of infringements on regulations is considered largest.<sup>30</sup> For inshore fisheries, monitoring generally focuses at landing, although at sea monitoring by the Coast Guard also occurs on issues such as the capture of undersized fish and illegal discarding. Given the 'risk-based' approach to the targeting of enforcement activity, identification of increased infringements of regulations in the coastal sector would lead to further at-sea coverage.

The cod and haddock fisheries engage some 4600 vessels that land cod in Norway, and 4150 are under 15 meters and fish near-shore.<sup>31</sup> For the latter group port controls are essential. All vessels above 15 meters are obliged to carry a logbook, detailing information about catches. Vessels below 15 meters have a simplified reporting log. Upon inspection, the contents of the hull are checked against the logbook. Prior to landing of catches, vessels are required to give notice of their intended landing site and quantity.

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<sup>30</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

<sup>31</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

All vessels over 21 m in Norwegian waters (about 400 Norwegian vessels) are subject to satellite based monitoring (applicable for vessels above 24 meters since 2000). In EU waters this applies to vessels above 15 meters.

The Fisheries Directorate is responsible for coordinating the monitoring efforts and has a dedicated unit for this work as well as dedicated personnel in the regional offices. In the northernmost regions (Finnmark, Troms, Nordland) where the majority of the fishery occurs, a particularly strict control regime is implemented in the seasonal fishery from January till June. A “Cod task Force” (targeting a number of fisheries, including haddock) has prioritized the following measures:<sup>32</sup>

- risk assessment of both vessels and buyers
- more controls in ports
- obligatory reporting in advance of landings
- strengthening of controls at sea

The Coast Guard (a part of the armed forces and under the Ministry of Defence) now performs close to 3000 inspections a year. Their larger vessels carry helicopters, and they utilize data from satellites and air surveillance of fisheries operations. The inspection activities of the Coast Guard in 2006 amounted to 2185 inspections in total, with 44 resulting in a report to the police and 27 and arrests.

The Fisheries Directorate carried out 5555 controls in 2008, up from 3005 controls in 2006.<sup>33</sup>

In addition, the activity of the sales organizations in enforcement means that the actual control frequency is much higher than the figures cited above suggests.

These figures should be viewed in the context of the strategic approach to enforcement, which means that the more a given fishery is considered to be a risk of violating rules, the greater the chance of being inspected.

The role of sales organizations in the control system is to ensure that the transaction between fisher and buyer is according to the rules regulating their relationship. All fish shall be weighed upon landing. All landings shall be reported. Under supervision of the Directorate of Fisheries, the fish sales organizations shall ensure that catches are not sold by unlicensed vessels and to check catches against quotas.<sup>34</sup> This role is regulated by law.

The 1938 Raw Fish Act provides for the establishment of fishermen’s sales organizations (cooperatives) with control over the first hand sales of fish. These bodies also play an important role in the enforcement of fisheries regulations. *Norges Råfisklag* covers the demersal fisheries in the Northern part of the country (from Nordmøre and Northwards).

The cornerstone of the control activities of raw fish sales organizations is the *contract note* (landing receipt), giving among other things the fish species, weight landed, and time of landing. 99% of the contract notes are completed and submitted electronically in almost real time, so aggregate landings

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<sup>32</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

<sup>33</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

<sup>34</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

data are updated continuously and transmitted to the Fisheries Directorate. About 200,000 forms are completed annually in the region of Norges råfisklag.

Figure 17 shows the contract note (“sluttседdel”).

**NORGES RÅFISKLAG** SLUTTSEDDEL Nr. 70 5001928  
 Org.nr. 938 469 148 Salgsdato 31/01/2004 FISKERS/LANDERS EKSEMPLAR

**Kjøper** Firmnavn 3 FISKEKJØP AS Mottaksstedets godkj.nr. A999 5 Mottaksstedets kommunenr. 1777 6 Nasjon det landes i NOR 4  
 Produsjonsanlegget 7 Prod.anleggets kommunenr. 8

**Ved landing til fartøy:** Fartøyet navn 9 Fartøyets type 10 Kjøperfartøy  
 Reg. merke Radiokallsignal 11 Flaggstat 12 Bønnelat  
 Transportskip

**Fisker** Firmnavn 13 OLA OLSEN Adresse 14 ABRAVIKA Postnr. 1007 Poststed 15 ABRAVIKER  
 Fiskefartøyet navn 16 RÅFISKLJENTA Fartøyet godkj.nr. 17 Registreringsmerke 18 A00ZA Radiokallsignal 19 Fiskefartøyet godkj.nr. 20 10160 H999 21 Nasjonalitet 22 NOR

**Fangsten** Fangstår 2004 Siste fangstdato 17/31/01/2004 Antall fiskedøgn 1 18 Kvote 19  
 Fangstboken nr./turn 9 9999 10 Fangstredskap 20 GARN 21 Vannlig kvote 22  
 Sone NOR Fangstfelt 300419 23 NOS ser for 62° N (sett kryss) 24 Ulovlig fangst 25 (sett kryss) 26 Andre lands kv. 27  
 Ungdomskvote 28

**Omsetning** Dir. levering 29 Aukasjon Kontraktsg 30 Kaisalg Avgiftsfritt 31 (sett kryss)

**Landingen** Landingsdato 31/01/2004 Kl. slutt 1600  
 Dellanding 32 (sett kryss) Førrige mottakssteds godkj.nr. 33  

Fiskeart	Størrelse	Tilstand	Kvalitet	Konservering	Levering	Anvendelse	Bruttovekt	Nettovekt	Pris	Verdi
TORSK	0.25	SU	A	FERSK	KASSE	HENG	1.270	1.150	16,00	18.400
TORSK	m.1.0	SU	A	FERSK	KASSE	SALT	465	420	13,75	5.775
SEI	0.23	SU	A	FERSK	KASSE	FERSK	142	130	5,00	650

 NESTE MOTTAKSSTEDS GODKJ.NR. 34

**Referanse** Seddelnr. 35 Forskudd Kr. 36 Ant.stk. 37 Totalverdi 24.825

Undertegnede er kjent med at opplysningsplikten er gitt i medhold av lov, at opplysningene brukes til blant annet kvotekontroll og at det kan medføre straff eller administrative sanksjoner å gi uriktige eller mangelfulle opplysninger.

**Underskrifter** Dato 31/01/2004 Sted ABRAVIKER Firmastempel  
 Kjøper Kari Olsson 38 Fisker / den som lander Ola Olsson 39

**FISKE KJØP AS** 30

**Eksempler er:**  
 SU - Sløyd uten hode  
 SM - Sløyd med hode  
 R - Rund

**30** Stempel for mottaksstedet.

- Sluttседdelnummer – 9 sifre.
- Salgsdato, vil i de fleste tilfeller samsvare med landingsdato. Unntak blant annet ved landing av ombordfrosnen fangst som ikke omsettes direkte.
- Navn på kjøper. Dersom mottaksstasjon, skal navn på produksjonsanlegget som mottar råstoffet fra stasjonen påføres.
- Organisasjonsnummer for kjøper jfr. pkt. 3 (Brønnøysundreg.) – 9 sifre.
- Godkjeningsnummer fra Fiskeridirektoratet for det anlegget hvor fangsten landes/mottas – fylkesbokstaver og sifre.
- Kommunennummer hvor mottaksstedet ligger – 4 sifre.
- Godkjeningsnummer fra Fiskeridirektoratet for det anlegget hvor fangsten skal produseres – fylkesbokstaver og sifre. Ikke nødvendig å fylle ut dersom mottakssted og produksjonsanlegg er det samme.
- Kommunennummer hvor produksjonsanlegget ligger – 4 sifre. Ikke nødvendig å fylle ut dersom mottakssted og produksjonsanlegg er det samme.
- Feltet brukes unntaksvis ved levering til godkjent kjøperfartøy etc.
- Organisasjonsnummer til fisker (Brønnøysundreg.) eller fødsels- og personnummer – 11 sifre.
- Fylles ut av de fartøyer som har radiokallsignal.
- Antall personer som inngår i besetningen.
- Godkjeningsnummer fra Fiskeridirektoratet for eventuell ombordproduksjon.
- Dersom fisket foregår med et annet fartøy enn det som har kvoterettigheter.
- Fylles ut med registreringsmerket for fartøyet som har kvoterettigheter. Fylles kun ut når fiskefartøy og kvotefartøy ikke er det samme.
- Feltet brukes unntaksvis når fangst landes fra kjøperfartøy etc.
- Brukes bl.a. til avstemming av fiske mot kvote. Ved overgang til nytt kvoteår, må fangst i de ulike år splittes på ulike sedler.
- Antall fiskedøgn føres her.
- Må fylles ut av fartøy som er pålagt å føre fangstdagbok.
- Fangstredskap føres her med navn – garn, line, jukse etc. eller med koden for de aktuelle redskap.
- Dersom ulovlig fangst. Norges Råfisklags rundskriv 1/2004 omhandler praksis ved inndragning av verdi av ulovlig fangst.
- For fritidsfiskefartøy skal det også avkrysses for vanlig kvote.
- Ved kaisalg er det kun kommunenummer som skal fylles ut i rubrikken som vedrører kjøper.
- Benyttes unntaksvis når kjøper ikke skal betale MVA (direkte eksport og ved utenlandske landinger).
- Dersom fangsten splittes og leveres på flere mottakssteder. Rubrikken om forrige mottakssteds godkjeningsnummer benyttes for dellanding 2, 3 osv og evt. neste mottakssteds godkjeningsnummer skal fylles ut hvis det er kjent.
- Fylles kun ut med landingsnummer hvis denne fangsten har vært på landingsstedet tidligere.
- Fylles ut dersom det tas ut et reelt forskudd hos fiskekjøper i form av kontanter, bunkers, varer etc. Maksimalt inntil den til enhver tid fastsatte prosentats av Norges Råfisklag.
- Benyttes for arter hvor kvote er i stk (kval, kongekrabbe).
- Dato/sted og signatur skal alltid påføres av kjøper og fisker/den som lander.
- Stempel for mottaksstedet.

Figure 17: The contract note used by Norges Råfisklag. Source: Norges råfisklag.<sup>35</sup>

The contract note requires about 30 pieces of information to be noted.

When the data are submitted, the sales organization transfers them to the Fisheries Directorate. The Directorate, in turn, checks these figures against the quotas that vessels have allocated to them. Norges råfisklag has a comprehensive system for following up on catches and landings record.

The substantial reduction in IUU fishing over few years, which previously caused uncertainty within the stock assessments, is the result of improvement in enforcement operations in Norwegian and Russian fisheries, greater compliance within the catching and transshipping sector, bilateral control agreements between Norway and 17 countries in Europe and a corresponding development in NEAFC (2007) which has led to increased collaboration with and reporting by ports receiving fishery products originating from the Barents Sea, and growing international reluctance to trade in IUU catches in general.<sup>36</sup>

<sup>35</sup> <http://www.rafisklaget.no/pls/portal/docs/PAGE/RAFISKLAGETDOKUMENTER/DIVERSEINFORMASJO/N/HVORDAN%2BFYLLE%2BUT%2BSLUTTSEDDEL.PDF>

<sup>36</sup> Meeting Fisheries Directorate 10 February 2009; see also: 82051/Moody Marine/Public Certification Report v4

### *Compliance*

The understanding of the need to regulate fisheries and restrict the way resources are harvested is well understood among Norwegian fishers.<sup>37</sup> The level of compliance with regulations is generally high. The inspections by the Coast Guard brought 304 warnings, 24 reports to the police, and 22 instances of vessels being brought to port for further investigations.<sup>38</sup> Similarly, the Fisheries Directorate in 2008 gave 23 warnings and reported 279 infringements to the police.<sup>39</sup> Considering the number of vessels engaged in the fishery and the number of landings, these are small figures.

## **6.5 Consultation and Dispute Resolution**

In the development of proposals for regulations, the fisheries authorities consult with the fishing industry and other stakeholders.

A Regulatory Council, where industry associations dominated, was in 2006 replaced with an open regulatory meeting where anyone interested can meet and have a say. Meeting documents are posted on the website of the Fisheries Directorate. Representatives for the fishing industry consult among themselves in advance of meetings and generally the Norwegian Fishermen's Association has been able to agree to compromise solutions on most issues among its constituent groups. When such compromises exist, the authorities will usually follow the stakeholder advice (Mikalsen and Jentoft, 2003). During the last decade, also environmental NGOs and indigenous populations (Saami) have become active stakeholders in fisheries and participate in the regulatory meetings. The consultation arrangement is mandated by the Ocean Resources law.

In addition to the consultation via the regulatory meetings, stakeholders have numerous other ways of interactions and influence with the government. The major industry organizations interact with the authorities on a regular basis through participation in delegations to international negotiations, written hearings on relevant issues where the Ministry seek the opinion of stakeholders (required by Norwegian law), direct meetings with the ministry, written communication and industry meetings where the authorities are represented. In the development of recent, new legislation, the industry has represented in the committee developing the initial proposal for the act.

The major organizations in the industry have elaborate decision-making processes where much emphasis is laid on building consensus on allocation of quotas among different gear groups.

There is an industry newspaper with 3 weekly issues and a web site that constitute important channels for communication within the industry as well as between the industry and the authorities.

## **6.6 Reviews of the management system**

Five sets of external reviews can be identified: first, the management system built on international agreements is subject to annual reviews by the parliament. The Ministry of Fisheries and Coastal Affairs has since 1995 presented such annual reports to the Parliament on the performance of the

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[http://www.fisheries.no/management\\_control/recourse\\_management\\_control/IUU+fishing+-+future+challenges+in+our+waters.htm](http://www.fisheries.no/management_control/recourse_management_control/IUU+fishing+-+future+challenges+in+our+waters.htm)

<sup>37</sup> Meeting Fisheries Directorate 10 February 2009.

<sup>38</sup> Undated (spring 2009) report from the Ministry of Fisheries: The Norwegian system for resource control – with reference to the cod fisheries. On file with author.

<sup>39</sup> Meeting Fisheries Directorate 10 February 2009; and Directorate web site:

<http://www.fiskeridir.no/fiskeridir/fiske-og-fangst/aktuelt/2009/0509/redusert-russisk-overfiske-i-barentshavet>

system.<sup>40</sup> Since most important fisheries are based on stocks shared with other countries, the emphasis is on how the agreements with other countries are implemented.

Secondly, the National Audit Office, which performs regular checks on the performance of all public service in Norway, has recently (2004) done a study of the public management of the fisheries sector.<sup>41</sup> This has subsequently been followed up upon through a process lasting several years. There has also been a joint Norway - Russia project to audit management systems, concluded in 2007.<sup>42</sup>

Third, Norway reports on its implementation of the FAO Code of Conduct for Responsible Fisheries, which covers almost every aspect of fisheries management, to the FAO Committee of Fisheries (COFI) every second year. An important task for COFI is to review countries' implementation of the Code. A recent study examines the actual implementation of the Code.

In addition, there are occasional external reviews where Norwegian fisheries performance is assessed in an international context. One example of such reports is a 2008 WWF study, which puts Norway in the top rank globally in terms of compliance with the FAO Code of Conduct for Responsible Fisheries.

Last, and most important, the continuous process of formulating scientific advice in ICES is a major scientific review of the data, methods and analyses developed by the Institute of Marine Research. This is the very foundation of resource management in Norway. This is a critical part of the annual decision-making cycle (cfr. above) where catch statistics and survey data are fed into to the ICES machinery for review and assessment, and combined with continuous work on methodological improvements to produce the annual scientific advice. A very important aspect of this is that Norwegian and Russian authorities base their decisions on the same scientific information and advice.

As to internal reviews, a regular, systematic review exists in the annual review by the Regulatory meeting (previously the Regulatory Council) of the regulatory arrangements for the year. Comprehensive review documents are posted on the website of the Fisheries Directorate before meetings. The meeting examines the experiences gained in the regulatory arrangements for the previous year and makes recommendations for the arrangements for the coming year.

Additional internal reviews can be found in Reports to the Parliament where various aspects of the regulatory arrangements are examined as a basis for proposals for change of elements of for example quota arrangements.

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<sup>40</sup> The last is Stortingsmelding nr 45 (2008 – 2009) Om dei fiskeriatvatalane Noreg har inngått med andre land for 2009 og fisket etter avtatalane i 2007 og 2008.

<sup>41</sup> Riksrevisjonen Dokument nr 3:13 (2003-2004): Riksrevisjonens undersøkelse av forvaltningen av ressursene

<sup>42</sup> Riksrevisjonens undersøkelse av forvaltningen og kontrollen av fiskeressursene i Barentshavet og Norskehavet – en parallell revisjon mellom norsk og russisk riksrevisjon. Dokument nr. 3:2 (2007-2008). Riksrevisjonen, Oslo. Available at: [http://www.riksrevisjonen.no/SearchTemplates/Template1/Click.aspx?/cgi-bin/MsmGo.exe?grab\\_id=0&page\\_id=410&query=fiskeri&SCOPE=Sok&hiword=FISKER%20FISKERIENE%20FISKERIE%20FISKERIET%20fiskeri%20?fraso=true](http://www.riksrevisjonen.no/SearchTemplates/Template1/Click.aspx?/cgi-bin/MsmGo.exe?grab_id=0&page_id=410&query=fiskeri&SCOPE=Sok&hiword=FISKER%20FISKERIENE%20FISKERIE%20FISKERIET%20fiskeri%20?fraso=true)

## 7 ECOSYSTEM CHARACTERISTICS

### 7.1 Ecosystem characteristics and habitats

The ecosystem approach has been agreed as a management principle in the Bergen Declaration from the 5th North Sea Conference and by the Norwegian Parliament in adopting the governmental white paper.

Knowledge of the ecosystem characteristics of the North East Arctic region can be divided into two separate areas: the Barents Sea to Lofoten (the subject of a management plan, as described in Norwegian Ministry of the Environment (2005)), and the remainder of the Norwegian Sea to the south of this area. These studies are relevant for coastal waters

The study of the ecosystem within the Barents and Norwegian Seas is the focus of a number of groups within the Institute of Marine Research (Bergen) and collaborative work with the PINRO laboratory in Russia (e.g. Anon, 2006). Areas of research include habitats and their significance for ecology and biological diversity; the health of benthic communities; oceanographic variability and changes in the marine climate for the production, distribution and behaviour of marine organisms; the distribution of species and their trophic interactions, as well as knowledge of non-commercial species, and indicators for marine ecosystem-based management.

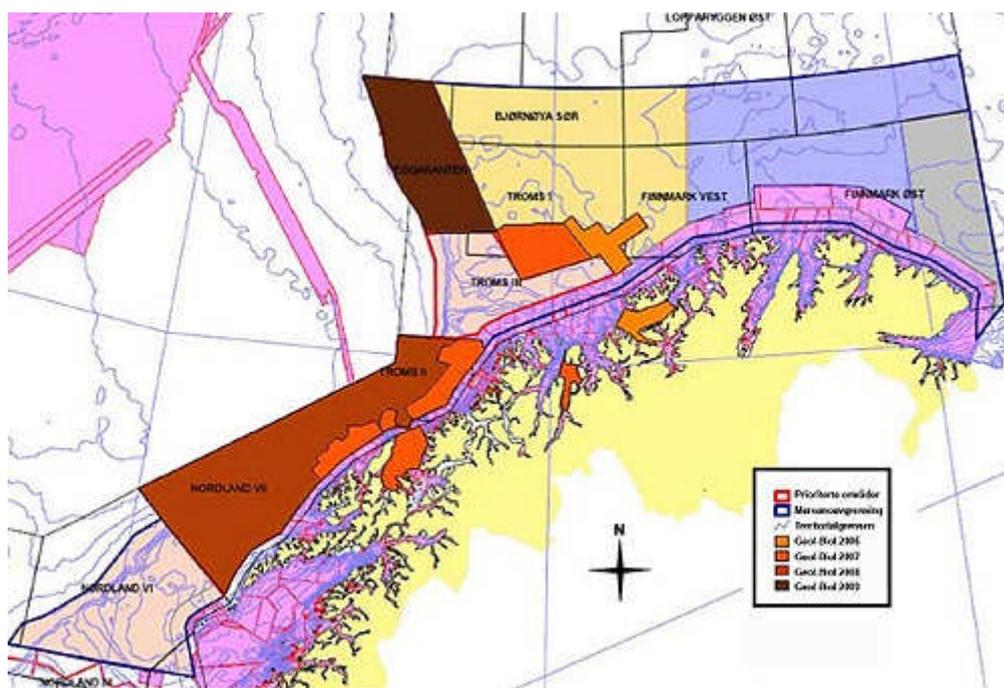


Figure 19. Areas mapped by the MAREANO programme. Areas marked in light orange were mapped in 2006. In 2007, areas on the Tromsøflaket, Troms II and Nordland VII were mapped (dark orange). In both years, some coastal areas were also mapped because of bad weather. Areas planned for mapping in 2008 and 2009 are shown in brown (Source: <http://www.mareano.no/english>)

The MAREANO programme<sup>43</sup> aims to survey and perform basic studies of the seabed's physical, biological and chemical environment. This follows the Norwegian Government's go-ahead for the

<sup>43</sup> [www.mareano.no](http://www.mareano.no)

launch of a marine survey programme in the Lofoten - Barents Sea region in 2005. While concentrated on offshore areas, coastal waters have also been monitored. Following collection, the data is entered into a database that covers Norway's coastal and marine regions, increasing the information on ecologically important benthic communities such as coral reefs and sponges. While the main coral areas have been identified, and the key areas protected as described, the collection of information is ongoing, and includes the gathering of information by fishers, and targeted and annual cruises through echosounder and multibeam mapping (Dolan et al., 2009). These activities are also related to the SUSHIMAP project which aims to develop a rapid, reliable and cost-efficient procedure for the mapping and monitoring of seabed habitats by integrating medium- and fine-scale data using visual and sediment-grab methods with large-scale bathymetric and backscatter data obtained by multi beam echo sounding.

Large 3D hydrodynamic numeric models are being continually developed, and models for the Barents Sea are run by both IMR and PINRO. Sub-models for phytoplankton and zooplankton are now implemented in some of the hydrodynamic models. However, strong assumptions within these models mean outputs must be viewed with caution. Given the importance of inshore fisheries and in particular fjord-based aquaculture production, and the unique environment provided by fjords, studies and models have also been developed to understand the hydrodynamic properties, nutrient, algal and plankton patterns in inshore waters (e.g. Gorsky et al., 2000; Viste and Hervig, 2001).

As noted, a management plan for the Barents Sea/Lofoten has been developed based upon the collation of a considerable range of data sources. The process for more southerly Norwegian Sea waters is less advanced. However, the Barents Sea/Lofoten plan stated "The Government also intends to start the preparation of similar management plans for the Norwegian Sea, using experience gained during the preparation of this management plan as a starting point". This process aims to present a white paper in 2009. Work on a representative selection of marine habitats in Norwegian coastal waters (national marine protection plan) is also said to be well advanced, and proposals are expected to be ready for public consultation so that protected areas can be established. In the second phase of the work on the marine protection plan (up to 2012), further areas will be protected and other adjustments made as necessary (see section 7.4).

## 7.2 Non-target, by-catch and discard species

The new Marine Resources Act and associated regulations (section 48) requires "All catches of fish shall be landed. Nevertheless, this does not apply to: 1) Fish caught in contravention of provisions set out in or issued under the Marine Resources Act and capable of surviving. Such catches shall be returned to the sea immediately; 2) Dead or dying fish of species other than [a list of specific species]". The list of species is:

Squid	Anchovy	Greenland halibut
Blue ling	Northern wolf-fish	Angler (monkfish)
Sprat	Tusk	Beryx
Blackspot sea-bream	Spotted wolf-fish	Slickheads
Atlantic wolf-fish	Sharks, including - blue shark - basking shark - porbeagle - Greenland shark - spiny dogfish	European sea-bass
Horse mackerel	Haddock	Whiting
Roughhead grenadier	Blue whiting	Halibut
Ling	Capelin	Pollack
Hake	Mackerel	Bluefin tunny

Morid cods	Orange roughy	Black scabbardfish
Arctic cod	Shrimps	Lumpsucker
Plaice and other fish of the family Pleuronectidae	Pilchard	Saithe
Fish of the family Ammoditydae, including sandeels	Herring	Skates
Greater forkbeard	Grenadier	Silver scabbardfish
Snow crab	Lesser argentine	Cod
Soles	Redfish	Fish of the family Bothidae, including - turbot - brill - megrim
Greater argentine	Wreckfish	Norway pout
Common eel		

The new Marine Resources Act requires fish previously considered as bycatch within the fishery to now be retained. This strategy allows the removals of all fish species of interest within the fishery to be quantified, assessed, and counted against relevant quotas. In turn, the requirement to retain fish provides an incentive to increase the targeting of desired species for commercial reasons, thereby increasing the incentive to minimise the catch of non-target species. Given regulation 48, there are effectively no non-retained species within this fishery. We consider all marine mammals and birds as iconic species, within section 7.3.

From prior knowledge of the fishery, likely main non-target fish species will include: coastal cod, NEA cod, saithe, redfish, skates and rays, dependent upon the gear used. Under the regulation, therefore, all main 'by-catch' fish within the cod and haddock fisheries must be landed or enumerated and will be counted against relevant quotas. While the complete collection of data for non-quota non-commercial species has only begun recently as a result of the regulation, data has been available directly from components of the fishery, where the catch is generally commercially viable, due to the previous ban on discarding, landings sampling, and the work of the reference fleet. Size information on landed individuals will be available through the sales organisations, but sex composition information is not collected. Independent observations of the catch of non-target species are more limited, due to their infrequency in the catch, irregular scientific observer studies and data from periods in which inspectors spend upon vessels, which may extend for a few weeks at a time. The new regulation requirements should provide a full basis to ascertain the interaction of the fishery with these species, although a time series of information would be advantageous in the scientific assessments needed to achieve this. This work is critical to identify the potential impact of fisheries on associated species and the ecosystem.

Strategies for the retained species are comparable to those for the target species. These include the closure of areas/move-on rules where undersized/juvenile fish are caught, being monitored by the Coastguard at sea; minimum size limits for many species (although when fishing for cod, haddock and saithe using trawls and conventional gear north of 62°N, an intermixture of up to 15% by number of cod, haddock and saithe under the minimum size is permitted in each catch); overall gear controls through (for example) mesh size limits; gear-specific closed areas and seasons (related to vulnerable marine ecosystems and including general exclusion of trawlers, longliners and Danish seines from fishing within the fjords); requirements for trawls to use sorting grids (the effectiveness of which has been tested); bycatch limits for particular species; and the requirement to retain all individuals of listed species.

ICES advice indicates that the majority of the main retained species are within safe biological limits.

However, there are a number of species of concern, being coastal cod, redfish (*Sebastes*), and non-ETP elasmobranch species (due to their vulnerable life history).

In coastal waters (notionally within the 12 nm Territorial Sea), NEA haddock are caught as a mixed catch with Norwegian coastal cod. Although treated as a single entity for assessment and management purposes, the Norwegian coastal cod stock probably comprises a complex of stocks where individual stocks are limited to just one or locally adjacent fjords. There is concern for the current low status of the coastal cod and management of the NEA haddock and cod fisheries (real-time and seasonal closed areas, and gear restrictions), particularly during the spawning season when it is most prevalent in coastal waters alongside coastal cod, is aimed at minimising coastal cod catches as far as is practically possible. The quantity of coastal cod taken is estimated *post hoc* on the basis of the IMR biological sampling programme and analysis of otolith characteristics of sampled cod (AFWG, 2008). The management measures in place for coastal cod, and the coastal cod recovery plan, are detailed in section 6.3. As noted there, ICES considers this plan consistent with the precautionary approach, but that rebuilding will take several years. As noted there, ICES considers this plan consistent with the precautionary approach, but that rebuilding will take several years. However, this is not an obstacle to certification. However, this is not an obstacle to certification.

*Sebastes* are the subject of ICES advice. ICES consider that the *Sebastes marinus* stock assessment is uncertain, and hence " There should be no directed fishery on *Sebastes marinus* in Subareas I and II. Area closures should be maintained and bycatch limits should be as low as possible until a significant increase in the spawning-stock biomass (and a subsequent increase in the number of juveniles) has been verified.". For the related species *S. mentella*, the advice on this stock for the fishery in 2011 is also the same as the advice given in recent years: There should be no directed trawl fishery on *Sebastes mentella* in Subareas I and II in 2011. Area closures should be maintained and bycatch limits should be as low as possible until a significant increase in the spawning-stock biomass (and a subsequent increase in the number of juveniles) has been verified.

Assessment of elasmobranchs is undertaken by WGEF (ICES Working Group on Elasmobranch Fisheries) but information is commonly insufficient to estimate stock status (see also Drevetnyak et al., 2005). WGEF has gathered landings (not discard) information for skates and rays in the region for the years 1973–2005 for the international fishery. Information on bycatch in the trawl fishery remains limited, but the University of Tromsø, Norway has initiated a study for a master degree with the title: "Elasmobranchs along the North-Norwegian coast- Diversity, distribution and density". Impacts on sensitive benthic habitats (coral and sponge communities) are directly evaluated with some areas being closed to trawling as a response. Whilst most interactions are well estimated, by-catches of skates and rays (and possibly other non-commercial ETP fish species, see below) are not currently estimated. Dolgov et al. (2005) attempted to estimate the **total** skate and rays catch during *international* trawl and long-line fishery for demersal fish in the Barents Sea and adjacent waters, which provides an indication of potential interactions in the coastal fishery. The estimation was based on a method used at PINRO to determine catch of demersal fish taken as bycatch. The estimated catch of skates was shown to be much higher than the official landings, which indicated that a large proportion of the skate catch was not used for production but discarded back to the sea. Information from the ICES WG on Elasmobranch Fisheries does include details from the Barents Sea (largely based upon Russian data) and Norwegian Sea (although data are highly limited). Information is insufficient to provide reasonable stock estimates at this time, although projects are underway to address this. As noted, this estimate was primarily focused on the activities of the offshore fishery segment, but concern remains due to the vulnerable nature of these species, resulting from their long-lived life histories and limited reproductive potential. The new Marine Resources Act requires that skates are retained and landed, which will provide comprehensive information on the frequency of interactions, level of catches and the potential to estimate population sizes. As this requirement has only come into force in 2009, data are not yet sufficient to quantitatively estimate the outcome status

nor measure trends. Additional ongoing monitoring of non-commercial fish species is available through research trawl surveys.

For these species and species groups, a range of management measures is in place that supplement the area closures, seasonal closures, gear design (e.g. mesh size, dimensions, sorting grids) regulations already in place for the gears under consideration.

For redfish, and elasmobranchs (specifically skates), the new Regulation to retain all caught individuals of these species will provide better future information on the levels of catches and status of these species. They will also allow the implementation of further measures if information indicates this is necessary. As noted, it is important that this information be examined for the fleet, and where necessary mitigation plans put in place. Further regulations for redfish include the potential closure of fishing to limit catches of fish under the minimum size (below 32cm in length).

There are gear-specific additional management restrictions:

### **Longline**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines. Long-liners fishing with automatic baiting also have to fish outside 4 nautical miles.

Redfish catch levels (species combined) within the Barents Sea by longliners were approximately 2 tonnes in 2008. This minimal bycatch represents an operational management measure to limit the impact on this species.

### **Trawl**

Relevant to coastal cod, trawlers have to fish outside 12 nm (6nm in some places).

While historically there was a directed fishery for redfish, this has now been banned. Regulations now stipulate a 15% bycatch limit by weight in each catch for trawls. In 2008, catch levels amounted to ~5500t. There are exclusion areas from the continental slope of Lofoten to the south, and strip from 62°N, to protect *Sebastes* spawning activity.

### **Danish seine**

Relevant to coastal cod, vessels fishing with Danish seine have to fish outside the fjord lines.

For Danish seines, estimates were made that less than 1% of the catch is comprised of redfish. Two periods of redfish prohibition for the coastal fleet, where between 1<sup>st</sup> March and 30<sup>th</sup> June, a 15% bycatch limit operates, and between 1<sup>st</sup> Sept and 30<sup>th</sup> Sept, no directed fishing allowed. Regulations now stipulate a 20% bycatch limit for conventional gears, calculated as live weight per week, or in each catch dependent upon the fishing approach.

### **Gillnets**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines.

The shallow nature of fishing means redfish are seldom caught by gillnets. Two periods of redfish prohibition for the coastal fleet, where between 1<sup>st</sup> March and 30<sup>th</sup> June, a 15% bycatch limit operates, and between 1<sup>st</sup> Sept and 30<sup>th</sup> Sept, no directed fishing allowed.

### **Hook and line**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines.

No information from the reference fleet is available on hook and line catches. However, levels are expected to be similar to those for longlines (in terms of CPUE). However, the species-specific nature of hook and line fishing essentially eliminates catches of redfish. Regulations now stipulate a 20% bycatch limit for conventional gears, calculated as live weight per week, or in each catch dependent upon the fishing approach.

Additional mortality to the species may occur through unobserved mortality (due to interaction of individuals with the gear but their not being retained), This is best be considered by gear:

### **Longlines**

Unobserved mortality of non-target fish species is anticipated to be low, based on both expert experience and research. For example, research in other hook and line fisheries suggests levels of unobserved mortality are likely to be low (e.g. <1%) or none.

### **Trawls**

Experiments on the degree of unobserved mortality within Norwegian trawl fisheries have been performed and estimates of mortality can be derived. Evidence suggests that haddock escape mortality is higher than cod, and inversely related to fish length, but not related to any selection device used or fishing intensity (e.g. codend meshes and sorting grid) not related directly to passing through the mesh. This subject has been a study of a PhD student at Bergen University.

### **Other conventional gears – gillnets, Danish seines, hook and line**

Experiments of unobserved mortality have not been performed for conventional gears. However, those performed for trawls (which are expected to result in a greater unobserved mortality) suggest that mortality from conventional gears is likely to be minimal by comparison.

## **7.3 Ecosystem impacts**

Coastal ecosystem impacts are considered as part of the regional ecosystem studies, as per the Management Plans described above. The ecosystem role of haddock within the food web characteristics of the Barents and Norwegian Sea regions has been examined, including some observations of temperature impacts (e.g. Dalpadado et al., 2009). Most ecosystem models in the area are focused upon the cod-capelin interaction. Within the Barents Sea, however, Blanchard et al, (2002) examined the food web within that region. Key interactions are thought to be between haddock and other gadoid species, mammals such as harp seals and minke whales, and the capelin (Barents Sea) and other fish that gadoids and mammals both feed upon. Food web studies (Ecopath) of haddock suggest that the species is not a critical prey species of any one predator species identified. There is no evidence of declines in marine mammal populations based on current monitoring information. Sufficient evidence is therefore available on the consequences of current levels of removal of target species to suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.

The predation on and prey of haddock is also reasonably well described in the Norwegian Sea, but is not yet at the same level as the Barents Sea. A number of other multispecies models have been developed to examine ecosystem interactions between exploited species, but their use is limited by

their data intensive nature.

Further ecosystem studies by IMR have been launched on *Lagenorhynchus* dolphins, following a recommendation from the North Atlantic Marine Mammal Commission (NAMMCO). The study aims to explore the ecology of Atlantic white-sided dolphin *Lagenorhynchus acutus* and the white-beaked dolphin *Lagenorhynchus albirostris* to increase knowledge of the ecosystem dynamics, and investigate the exposure of mammalian top predators towards environmental contaminants and study effects on their health status. In addition to sightings, this programme involves the capture and post-mortem examination of specimens. While there appears little interaction between gears within this fishery and dolphins, the study will enable better observation of fishery links, and explore the ecology of these predators to increase understanding of the dynamics of the ecosystem and its dependent species (see also Section 7.5).

#### **7.4 Habitat interactions**

Through work underpinning the ecosystem management plans, as discussed in section 7.4, key geographical areas have been identified that are important for biodiversity and biological production in the area, and where adverse impacts might persist for many years. Besides being important within the life history stages of key commercial fish species (e.g. spawning and nursery areas), several areas have been identified as important as breeding, moulting or wintering areas for seabird populations of international importance. In addition, the areas identified include valuable and vulnerable habitats where the benthic fauna included species such as cold-water corals and sponge communities. Unintentional negative impacts on these species “are to be reduced as much as possible by 2010”. These have the potential to interact with the haddock fishery, but are the subject of measures to reduce interactions (see below)

On the basis of these studies, the most vulnerable areas within the region have been identified and oil and gas activities forbidden in these areas. The new Marine Resources Act (enabled 2009) and associated regulations cover Norwegian vessels, within Norwegian land territory with the exception of Jan Mayen and Svalbard, in the Norwegian territorial sea and internal waters, on the Norwegian continental shelf, and in the areas established under sections 1 and 5 of the Act of 17 December 1976 No. 91 relating to the Economic Zone of Norway. The Act can be extended to include Norwegian land territory on Jan Mayen, Svalbard, Bouvet Island, Peter I's Island and Dronning Maud Land.

Furthermore, the activities of IMR and the fishery organisations have identified key areas of vulnerable habitat in relation to fishing activities. Eight marine protected areas have been established under the fisheries legislation to specifically protect coral reefs from damage caused by “gear that is towed during fishing and that may touch the sea floor” (see <http://www.fiskeridir.no/english/fisheries/marine-protected-areas>). These include the Sula Reef (Sularevet , 1999), Iverryggen Reef (2000), the Røst Reef (Røstrevet, 2003), Tisler and Fjellknausene Reefs (2003). These areas protect these specific vulnerable species and habitats from disturbance. In addition, the world's shallowest known Lophelia-reef, Selligrunnen, rising up to 39 m depth below the surface, has been temporary conserved pursuant to the Norwegian Nature Conservation Act by the environmental authorities (2000) ([http://www.fisheries.no/management\\_control/environmental\\_impact/coral\\_reefs.htm](http://www.fisheries.no/management_control/environmental_impact/coral_reefs.htm)).

Areas of vulnerable seabed habitat have therefore been identified and assessed through numerous research surveys using side-scan sonar and benthic approaches, as well as the active participation of the fishing industry. This has enabled the detailed determination of habitat sensitivity (notably cold water corals and sponge communities) and supports closed area management to protect them (see above and below). Areas of strong tidal currents are associated with coarse sediments characterised by sessile epibenthic communities dominated by suspension-feeders. Critical habitats such as

spawning areas are well identified. In addition, programmes are underway (MAREANO programme) to perform studies of the seabed's physical, biological and chemical environment, and identify further key areas in greater detail. Information is recent and ongoing for all areas (MAREANO and other programmes underway through IMR and Polar Institute). The success of the closed area strategy can therefore be assumed successful with a high degree of certainty.

The habitat interactions of the different gears within the NEA haddock fishery vary. The development of the Barents Sea Management Plan includes a process of Environmental Impact Assessment including fishing operations. Further habitat impacts are the loss of and potential ghost fishing of gears. Regulations specify the requirement to attempt to retrieve lost gear and if unsuccessful report the incident and location to the Coastguard.

### **Trawls**

While trawlers are required to operate outside 12nm for the majority of the Norwegian coastline, this is reduced to closer inshore for particular areas. Discussion of trawl activities and impacts is therefore relevant to this certification.

The Directorate of Fisheries has issued 14 temporary licenses in 2011 for pelagic trawls. However, only 4 vessels have carried out some limited fishing with this gear, including research to increase selectivity. The use of pelagic gears will essentially eliminate benthic impacts, and impacts on the pelagic system are expected to be negligible and transient. , these gears are primarily used further offshore. The use of semi-pelagic gear by some vessels will reduce – but by no means eliminate – benthic impacts. The lower bridle weights used will impact on the sea bed, and may result in considerable localised damage along the tow. In turn, the footrope is also in contact with the seabed. However, relative to the demersal trawl both the door and bridles will not be in contact with the seabed. Indeed, the industry reports up to a 30% saving in fuel using semi-demersal trawl, indicating the lower level of drag compared to the demersal trawl. However, damage can still be caused, in particular by the twin-rig 'clump'.

The primary inshore trawl fishing method is the use of demersal trawls. Demersal trawling has been shown to impact upon sea bed structure and the abundance of cold-water corals etc. The total impact of benthic fishing (trawl and Danish seine) activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed. However, the impacts of trawls are recognised, and research has been performed on the impacts within the Barents Sea. Hence the impact on similar inshore areas can be inferred. In general, in this muddy, more mobile habitat, trawling was felt to affect the benthic assemblage mainly through resuspension of surface sediment and through relocation of shallow burrowing infaunal species to the surface of the seafloor. However, more significant effects can occur where seabeds are more stable in habitat, and the extent and reversibility of changes depends on the natural disturbance regime and inherent productivity of the system affected. The BSMP process includes a process of Environmental Impact Assessment (EIA) including fishing operations.

As noted, there is the potential for trawl gear to affect the productivity of benthic communities. Although scientific research has been performed to examine this, conflicting results suggest that while certain communities will be adversely affected, others might benefit from increased availability of particular organisms, and that productivity may overall be increased.

Impacts on habitat structure are expected to be reduced by the restrictions on trawling within particular distances of the coast, implementation of trawl free zones and implementation of closed areas to protect vulnerable habitats (e.g. five areas closed to towed gears to protect cold water corals, a number of these within coastal waters, including Fjellknausene and Tisler reefs, while Selligrunnen Reef is the world's shallowest *Lophelia* reef).

The main impacts will occur if fishing moves to new areas, since existing fishing grounds (away from sensitive habitats) will have reached a new equilibrium state. However, sufficient data is collected to detect and evaluate any significant extensions of trawl areas; overall, fishing positions are recorded accurately through logbook/landing declaration records. Although note yet performed, the positioning of trawl activities relative to the mapping of the seabed performed under the MAREANO and other programmes could be performed. However, current activities are focused on the potential interactions with cold water corals, and the management of these interactions, since impacts may be severe.

Gear loss can potentially be caused through either (i) an excessive catch (although this usually results in the cod-end bursting rather than loss of the trawl) or (ii) through the gear snagging on the bottom, for example after an engine failure or some other power loss. When gear is lost, position is recorded and retrieval put in place. The loss is extremely rare, with gear retrieval surveys in offshore areas only identifying three parts of a trawl in 2006 in 62 hauls, and not all these will be from the fishery under certification. The ability of an abandoned trawl gear to continue to capture fish is limited, as the trawl gear only fully functions when under powered tow – estimates of impact can therefore be made. If a gear is lost with the doors it will remain in place. If lost without doors, it may drift with bottom currents, although the weight of the gear components will limit this. Under this scenario, some localised damage to benthic structures and communities may be possible through smothering. A complete trawl gear has not been lost in the last 10 years, only one trawl door has been lost in that period.

### **Longlines**

Longline operations have some potential to impact on the bottom habitat. Impacts of longlines on the demersal habitat would stem from the movement of anchors (~30kg) on the sea bed due to currents, and potential snagging and limited smothering and abrasion of the line on key demersal habitats. Bottom-set longlines may snag on benthic epifauna, and irregular objects on the bottom, which may damage or move objects, but often the line breaks and remains underwater and gradually entangles itself and other bottom features. The key determinant of the effects of longlines is how far they travel over the seabed during setting and retrieval, (significant distance is more likely to be covered during the retrieval period). In addition to the line and hooks, anchors can be pulled some distance across the seabed before ascending. In general, however, longline fisheries offer the potential to conduct fisheries without significant habitat damage.

Overall, all fishing positions are recorded accurately through logbook/landing declaration records, locations of sensitive habitat have been determined, and the impacts on the sea bed from longline fishing gear are known, and generally considered to be relatively minor (but not negligible).

Longlining is permitted in areas closed to towed gears. While impacts on critical habitats (e.g. areas of cold water corals) are known to occur through net retrieval surveys that have been carried out for over 20 years, these are extremely limited due to the limited fishing that would occur in these areas, due to the risk of snagging of gear on sea bed features. It is also noted that vessels can voluntarily avoid areas of coral reef etc to avoid snagging of gear. In comparison to the potential effect of trawls, the impact is considered extremely minor.

However, there is no specific determination of impacts on habitat to demonstrate that no unacceptable impacts are occurring.

Loss of longline fishing gear is also rare; losses would require that both ends of the line would need to be lost, or a break in the line to occur at two points for loss of a segment of gear to occur. Lines are known to snag on the sea bed and may lead to breakages on hauling. The speed and pressure on the line is monitored to avoid losses, but losses do still occur. In the Norwegian economic zone, retrieval

surveys have been performed on a yearly basis. Over 1500m of longline gear was found during the 2005 survey in the “North Norway” area, indicating that the loss of longline gear can be an issue. Estimates from related Norwegian fisheries suggest a maximum of 30 lines being lost per trip, at ~180m per line (although this included the replacement of old lines, which are not actually ‘lost’). Longlines will not ghost fish following the removal or degradation of the bait (a short term issue, estimated to be less than a day), as the bait keeps the hooks off the sea bed. Once removed, the hooks will lie on the seabed and the lack of bait will prevent ghost fishing.

### **Gill Net**

Gill nets have the potential to impact on the bottom habitat, but for gill-nets this is most likely only in shallow waters. The gear used principally affects the water column but with anchors on the sea bed. Impacts would be restricted to dragging of anchors and dragging/entanglement of lost nets. Significant impacts would occur in areas of sensitive benthic communities such as corals and sponges. *Lophelia* reefs are considered good fishing places for net fishing, and evidence of lost gill nets and other types of fishery related equipment was found. Although these fishing techniques can cause breakage and disturbance of corals it was considered that the damage is of limited extent compared to the effect of bottom trawling. Studies have been carried out on coral community recovery. Smothering of habitat could occur where nets are lost. The BSMP process includes a process of Environmental Impact Assessment including fishing operations. Investigations of damage from fishing gear to coral areas show considerably less impact from static gears than mobile gear. No unacceptable impacts are anticipated from this gear type and there is no suggestion from evidence collected to date of any significant impacts occurring.

Gill nets can be lost, although vessels must attempt to recover the nets, and the frequency of losses has been reduced by the regulation to tend the net each day. By regulation, if gear remains lost it must be reported to the Coastguard. The effect of lost gillnets on the ecosystem is not well understood, although limited investigations have shown that gillnets lost in deep water (>400m) can fish for years after they are lost because there is very little bio fouling in depths below 400m, and there is insufficient water turbulence to wrap the gear and prevent it from fishing. In the Norwegian economic zone, problems of lost gear over the last couple of decades have been addressed by annual net retrieval surveys (see <http://www.fiskeridir.no/english/reports/retrieval-surveys-for-lost-gill-nets>). Lost gear seems to arise predominantly from Greenland halibut fisheries (in 2005, 30 of 474 lost nets were from the related cod directed fishery; Misund et al. (2005)). Norway has also introduced management measures on soak time and gill net length (see 2.2.2). This information allows an estimate of unobserved mortality to be derived. The catching efficiency of lost gill nets is indicated to depend upon depth, and has been examined for some species and areas, but at present no estimate of the total effect is available. Impacts can therefore be calculated from existing data on gear loss, catch rates etc.

### **Danish seines**

Danish seine fishing operations have the potential to impact on the bottom habitat. The total impact of benthic fishing (trawl and Danish seine) activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed. However, the impacts are recognised, and research has been performed on the impacts within the Barents Sea, focussed mainly on trawl gear, as described above. The environmental footprint of Danish Seines is significantly less than that of demersal trawls.

Danish seines (being a towed gear) are excluded from the specified five areas of cold water coral. Overall, all fishing positions are recorded accurately through logbook/landing declaration records.

Gear loss can potentially be caused through the gear snagging on the bottom. When gear is lost,

position is recorded and retrieval attempts are made as required by regulation. Gear retrieval surveys only identified one part of a Danish seine in 2006 in 62 hauls. The ability of abandoned Danish Seine gear to continue to capture fish is limited, as the gear only fully functions when under powered tow – estimates of impact can therefore be made. If a gear is lost it may drift with bottom currents, although the weight of the gear components will limit this. Under this scenario, some localised damage to benthic structures and communities may be possible through smothering.

### **Hook and line**

Hook and line gear is not expected to have impacts on benthic habitat structure. The fishery will have a negligible impact upon the structure and function of the pelagic habitat. The BSMP process includes a process of Environmental Impact Assessment including fishing operations. No unacceptable impacts are anticipated from this gear type and there is no suggestion from evidence collected to date of any significant impacts occurring.

Hooks can be lost if fishing occurs near the sea bed, due to snagging on gill nets for example. Ghost fishing with hooks is unlikely, as the hooks are unbaited (artificial lures being used). However, lost gear could present some minor entanglement risks.

## **7.5 Endangered, Threatened and Protected (ETP) Species and other iconic species**

Norway has signed a number of conventions on species protection and management. The Convention on Biological Diversity sets out a general framework for these efforts, and proposals and decisions on which species should be given special protection are made under the regional and global nature conservation conventions, primarily the Bern, Bonn and CITES Conventions.

Definition of ETP species can be taken from a range of sources. That used to provide an indication for this scoring is the integrated management plan for the Barents Sea, which describes the management of endangered and vulnerable species, related to a number of conventions signed by the Norwegian Government (e.g. Convention on Biological Diversity, and Bonn, Bern and CITES Conventions), while the IUCN Red List is also used as a guide to endangered and vulnerable species by the management plan. The taxa included within the IUCN Red List are “the bearers of genetic diversity and the building blocks of ecosystems, and information on their conservation status and distribution provides the foundation for making informed decisions about conserving biodiversity from local to global levels”. Information available from the 2010 Norwegian red list, which is developed using IUCN criteria, indicates a number of marine species which are considered ETP, or data deficient. These primarily include marine mammals, and birds.

NAMMCO (the North Atlantic Marine Mammal Commission), along with IWC and ICES, have recommended that member countries, including Norway, should monitor and report by-catches of marine mammals and seabirds. For the coastal and inshore fisheries, vessel owners have provided information on effort, catch and by-catch over the period October-December 2005, in return for financial compensation. These concentrated on gillnet and trap fisheries. Further information on some by-catches is also collected by the ‘reference fleet’ operating in Norwegian waters.

Through the work underpinning the BSMP, key geographical areas have been identified that are important for biodiversity and biological production in the area, and where adverse impacts might persist for many years. Besides being important within the life history stages of key commercial fish species (e.g. spawning and nursery areas), several of the areas were also identified as important as breeding, moulting or wintering areas for seabird populations of international importance, such as the lesser black-backed gull (subspecies *Larus fuscus fuscus*), Steller’s eider and Atlantic puffin (Stiansen et al., 2005). In addition, the areas identified include valuable and vulnerable habitats where the benthic fauna included species such as cold-water corals (the largest known cold-water

coral reef is off Røst in the Lofoten Islands) and sponge communities. Unintentional negative impacts on these species “are to be reduced as much as possible by 2010”.

The importance of the life history and population trends of bird species within the ecosystem of the Barents Sea, and their links to human activity, is recognised in the BSMP White Paper. However, information with which to examine the bycatch of birds within fishing operations is incomplete; scattered information about bycatches of various species is available, for example, from longline fisheries and some gill-net fisheries. At certain times and in certain areas, there can be relatively large bycatches of diving seabirds in gill nets. Although not directly related to the haddock-targeted fishery, large bird bycatches have been reported from the spring cod fishery in shallow waters near land and from the lumpsucker fishery.

To address this information need, the Norwegian Government has contributed to the development of the SEAPOP (Seabird Population Management and Petroleum Operations) programme. This programme aims to improve knowledge of seabirds through studies of distribution and population size, in order to help distinguish between natural variations and anthropogenic impacts. A new web-based mapping tool for seabirds in Norway is being established to make it easier to access up-to-date information. Several bird scaring devices has been tested for longlining, and a bird-scaring line has been found to reduce significantly bird by-catch, as well as increase fish catch due to the reduction in bait loss. The Barents Sea/Lofoten ecosystem management plan indicates “In the light of new knowledge, the Government will assess the need for restrictions on gear to reduce bycatches of vulnerable seabirds in certain areas and during certain periods. The Government will also take steps to reduce bycatches of seabirds through the development and adaptation of suitable gear. In this context, the Government will consider making it mandatory to implement measures that have proved effective in reducing bycatches (such as the “kjalkeskrema” bird-scaring device) which have proved effective in reducing bird bycatch in the longline fishery. It should also be noted that although not currently the case, there is provision within the Act for the Ministry to lay down a duty to land bycatches of other marine organisms, including plants, marine mammals and seabirds, or a duty to provide reports on such bycatches. There has also been some consideration in BSMP on indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding).

Numerous Norwegian research and ecosystem cruises have been performed in this area, examining benthos, fish, bird and mammal distributions and abundance. In turn, the area is the focus of a large amount of research by IMR on habitats, oceanography, biological distributions, and trophic interactions. Population levels of and fishery interactions of other ETP species such as birds and marine mammals have been studied through a range of approaches, while the Institute of Nature Research (NINA) have investigated the interactions between seabirds and fisheries. The ability of the data to quantitatively estimate outcome status with a high degree of certainty varies with the ETP species.

#### **Sea mammals.**

NAMMCO (the North Atlantic Marine Mammal Commission), along with IWC and ICES, have recommended that member countries, including Norway, should monitor and report by-catches of marine mammals and seabirds. IMR have a programme examining the ecology and ecosystem dynamics of *Lagenorhynchus* dolphins, following this recommendation. The programme is investigating the exposure of mammalian top predators to environmental contaminants and its studying effects on their health status.

Harp seals are subject to population assessments by a joint ICES/NAFO working group (WGHARP). The 2009 assessment was uncertain, with new surveys indicating reduced pup production, with notable declines suggested from 2003 levels. As a result the assessment model was rejected and an

alternative approach used to estimate TACs for seal hunting at 30,062 animals. The level of mortality resulting from gears is felt unlikely to be equivalent to direct mortality through culling. However, further information is needed from the fishery to confirm this.

For the coastal and inshore fisheries, vessel owners have provided information on effort, catch and by-catch over the period October-December 2005, in return for financial compensation. These concentrated on gillnet and trap fisheries. Further information on some by-catches is also collected by the 'reference fleet' operating in Norwegian waters, which includes most of the gears under consideration within this certification.

### **Seabirds**

The BSMP notes the importance of the life history and population trends of bird species within the ecosystem of the Barents Sea. The SEAPOP (Seabird Population Management and Petroleum Operations) programme has been developed to examine this further. A joint Norwegian-Russian database of bird colonies in the Barents Sea also exists ([http://www.barentswatch.com/bw/bw\\_06/bw\\_06\\_en.pdf](http://www.barentswatch.com/bw/bw_06/bw_06_en.pdf)). Links between bird numbers and prey levels have been developed (e.g. guillemots, puffins, spring-spawning herring, capelin).

Information on bird bycatch within fisheries is incomplete, however. Scattered information about bycatches of various species is available, for example, from longline fisheries and some gill-net fisheries. At certain times, and in certain areas, there can be relatively large bycatches of diving seabirds in gill nets, although whether this is within the gill net fishery under certification is unclear. The SEAPOP (Seabird Population Management and Petroleum Operations) programme has been developed to examine this further, while NINA have been studying fishery/bird interactions.

- **Longlines**

Interactions of longlines with sea mammals are thought to be extremely minor. Hooks are too small to lead to marine mammal bycatch, and no evidence of issues is available for the Norwegian longline fleet. While mammal-longline interactions are noted in the Southern Atlantic (e.g. killer whales preying on longline catches, sperm whales being entangled in longlines), no similar issues have been noted by the industry, IMR or enforcement officers.

Some self-monitoring of seabird bycatch has occurred in parts of the Norwegian longline fleet (including the reference fleets), with less than 1 bird per day estimated to be caught (this being a winter, and hence night-time fishery). Other studies have suggested that North Atlantic haddock fisheries using longlines may result in bird bycatches at rates of up to 1.75 birds per 1000 hooks, although rates may be less if lines are set at night. IMR has also performed research on the rate of bird bycatch in longlines fisheries and examined approaches to reduce these rates. Seabirds scavenge baits from the hooks of commercial longlines, resulting in incidental seabird mortality and bait loss. The great majority of the birds caught were northern fulmars (*Fulmarus glacialis*). Studies showed that with a total of 185 000 hooks set, 205 birds were caught (1 every 900 hooks). A longliner sets ~ 30,000 hooks per day, suggesting on average a catch of ~ 33 birds on lines without mitigation measures. With the use of mitigation measures (use of a bird scaring line, or "kjalkeskrema"), which all vessels within the fleet are indicated to use voluntarily to reduce bait loss due to birds, bycatch was reduced to 2 birds for this number of hooks, while in other experiments no birds were caught on 58,420 hooks when a bird scaring line was used. Seabird interactions have also been recorded through the commissioned vessel scheme and has been considered under the BSMP. Seabird interactions have been investigated by the Institute of Nature Research (NINA) as to the significance of such interactions on seabird populations. Presently, according to the Barents Sea management plan, bycatch levels "did not constitute a threat to the population" but are nonetheless at a significant level. However, figures directly from this component of the fleet were not available, and formal and

detailed collection of information by the fleet is lacking.

Regulations limit the use of autolining in certain seasons (unless pelagic longlining for haddock). Further operational strategies exist which will reduce interactions with birds. Fishing concentrates in the late autumn and winter (October-April, although the period may extend), which reduces the period of overlap with, for example, nesting seabirds.

- **Trawl**

Interactions of trawl gear with sea mammals are expected to be limited, but will vary dependent upon the demersal or pelagic nature of the gear used. For example, pelagic fisheries elsewhere are known to take small cetaceans, possibly in significant numbers. The introduction of pelagic trawls to the fishery therefore raises the risk that small cetaceans may be taken, but is unlikely to prove a significant problem at present due to the low number of pelagic trawls being used. However, further monitoring is needed to confirm this, particularly if this fishing method expands.

Norway observers spent 3700 hrs on demersal trawls (target spp unspecified) and no marine mammal interactions reported (NAMMCO 2005). Contracted commercial vessels have also made direct observations and no marine mammal interactions were reported. Evidence therefore supports an estimation that the occasional interaction can occur, but rarely.

Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in the BSMP of indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and trawls does not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered. Interactions with birds are rare, with owners observing that birds may very occasionally be seen striking trawl warps, but have never seen caught in net. This is supported by observations from trawlers within the reference fleet.

- **Gill Net**

It should be noted that the by comparison with trammel nets, the interaction rates of marine mammals and gill nets are significantly lower.

Studies have shown that gill nets set inshore with varying mesh sizes may interact with sea mammal populations, with key interactions noted with harp, common and harbour seals. Gillnets operating inshore with 180mm mesh (slightly larger than the mesh size specified by regulations in the haddock fishery) caught the majority of grey and harbour seals and harbour porpoises, being 31 out of 40 incidences (see also Bjørge and Kovacs (in prep)). Records exist of catches of seals within gillnets deployed in the Barents Sea, during the winter of 1987/88. This was felt to be a result of low capelin stock levels driving seals offshore in search of food. These species are not considered ETP in Norway, but include those for which Norway has accepted responsibility to maintain the population status (e.g. species which are globally threatened or over 25% of the total European population resides within Norwegian waters). The catch rates were noted by the Barents Sea Management Plan to be significantly lower than the allowable sustainable harvest of harp seals (ASCOBANS report that additional fishery induced mortality of 1.7% of the population estimate may be sustained by harbour porpoise populations, which would equate to approximately 800 animals annually). Population status for harp seals are well monitored and incidental mortality rates in the haddock fishery are not expected to result in significant population impacts.

Harbour porpoise interactions with gill nets are well monitored through sampling of the fleet and specific commissioning of vessels to record interactions, and can be examined through the reference fleet.

Seabird interactions have been recorded through the commissioned vessel scheme and have been considered under the BSMP. Seabird interactions have been investigated by the Institute of Nature Research (NINA) as to the significance of such interactions on seabird populations. Available information suggests that bird catches are very low in the gillnet fishery and do not include species of high ETP concern. Records of interactions with ETP fish species (again notably skates and rays) is not established. Effects of fishing gear on corals have been estimated, although principally for mobile gear.

- **Danish seine**

Interactions of Danish seine gear with sea mammals is expected to be limited. Norway observers witnessed 355 hauls on seine vessels (target species unspecified), and no marine mammal interactions reported (NAMMCO, 2005). Also contracted commercial vessels have made direct observations (30 hauls) also reported no marine mammal interactions. Evidence therefore supports the estimation that the occasional interaction could occur, but rarely. Interaction between young seals and ‘bottom set nets’, which may include Danish seines, have been noted (Bekby, 2001).

Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in BSMP on indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and Danish seines do not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered.

Further strategies are operational. Fishing occurs mainly in January to May, which will reduce interaction with feeding birds in many months, although daylight fishing is important when targeting haddock. The low speed of fishing means escape of any marine mammals is achievable, further reducing interactions.

- **Hook and line**

In general, the method is felt reasonably species-specific. Negative interactions with sea mammals would not be anticipated with this gear. Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in BSMP on indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and handlines do not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered.

## 8 OTHER FISHERIES AFFECTING TARGET STOCK

The NEA haddock fishery primarily comprises part of the much larger NEA cod fishery with only relatively small, seasonal targeted fisheries for haddock, where cod may be then be taken as a bycatch. As with the haddock, the NEA cod is also subject to a full analytical assessment by ICES and is being fished sustainably at a level that maintains full reproductive capacity (ACOM, 2010e). The Norwegian NEA cod fishery is also being subject to parallel review for MSC certification. The offshore component of the NEA haddock stock (outside 12nm) is, as already noted, subject to a separate - successful - MSC certification (April 2010). Fisheries in the Russian sector also target the same stocks in the Barents Sea.

NEA haddock are taken in the targeted saithe fisheries, three of which (Norwegian, German and French) have already been awarded MSC certification.

## 9 STANDARD USED

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock exists, and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations. The Principles and their supporting Criteria are presented below.

### Principle 1

**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.<sup>44</sup>**

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

#### Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

### Principle 2

**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.**

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<sup>44</sup> The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

**Criteria:**

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

**Principle 3**

**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

**A. Management System Criteria:**

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process.
3. Be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings.
4. Observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.
5. Incorporates an appropriate mechanism for the resolution of disputes arising within the system<sup>45</sup>.

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<sup>45</sup> Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

6. Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.
7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty.
8. Incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.
9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.
10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
  - a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
  - b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
  - c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
  - d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
  - e) establishing no-take zones where appropriate.
11. Contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

## **B. Operational Criteria**

Fishing operation shall:

12. Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.
13. Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
14. Not use destructive fishing practices such as fishing with poisons or explosives;
15. Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch etc.
16. Be conducted in compliance with the fishery management system and all legal and administrative requirements.
17. Assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

## **10 BACKGROUND TO THE EVALUATION**

### 10.3 Evaluation Team

**Lead Assessor: Andrew Hough:** Moody Marine Limited. Dr Hough has a PhD in marine ecology from the University of Wales, Bangor and fourteen years post-doctoral experience in commercial marine and coastal environmental management projects. He is manager of Moody Marine operations within Moody International Certification with particular responsibility for the implementation of MSC Certification procedures and development of MSC methodologies. Dr. Hough has acted as lead assessor on the majority of Moody Marine MSC pre assessments and main assessments.

**Project Coordinator: Seran Davies:** Moody Marine Limited. Seran is a qualified marine biologist with eight years direct experience of marine environmental management and assessment, including fishery evaluations and EIA of developments in marine and freshwater environments.

**Expert advisor: Stephen Lockwood.** Stephen is an independent marine environment consultant and chairman of the Welsh Minister's fishing industry consultation group. Until 1999 he was Head of the UK Ministry of Agriculture, Fisheries and Food laboratory at Conwy, which undertook research and development work in the fields of fish and shellfish cultivation, and the environmental effects of fishing. At a personal level, he was responsible for providing advice to MAFF policy divisions, and through them to ministers, across the broad field of coastal zone management. Previously, he led research and providing scientific advice on the conservation of fish stocks and the management of fisheries, including the Western mackerel stock, Celtic Sea and Bay of Biscay Demersal fisheries, Pilchard (*Sardina pilchardus*) stocks and Western English Channel herring and sprats. He has published on stock assessment, fishery management and coastal development issues.

**Expert advisor: Graham Pilling.** Graham is a Fisheries Biologist & Advisor and Head of the Seas and Oceans Group with the Centre for Environment, Fisheries and Aquaculture Science (Cefas), UK. His experience includes working in tropical, temperate and polar marine and freshwater ecosystems, gaining in depth experience in the practical assessment and management of pelagic and demersal fisheries through a wide range of methodologies. He has chaired FAO GFCM and EU STECF SGMED stock assessment meetings on demersal species in the Mediterranean, and has been an expert reviewer for a number of US stock assessments. He has developed and implemented models to simulate the long-term impacts of uncertainty in stock biology and assessments on fisheries management, and methods to assess and manage data poor fisheries. He has also taken part in the MSC assessment of a wide range of fisheries, concentrating on Principle 2 (environment and ecosystem) issues.

**Expert Advisor: Alf Håkon Hoel.** Alf Håkon is currently Associate Professor, Department of Political Science at the University of Tromsø specialising in management regimes for living marine resources. His experience includes acting as a member of the National Committee on Environmental Research, the Programme on Biodiversity Research, Norwegian Research Council, advisor to the Royal Norwegian Ministry of Foreign Affairs on the management of living marine resources, member of the board of the Roald Amundsen Centre for Arctic Research, University of Tromsø, a member of the Norwegian delegation to the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, vice-chair, National Committee of Polar Research, Norwegian Research Council, member of the Norwegian Research Council's committee on global change research, project leader for the Norwegian Research Council's study on research on Svalbard, FAO consultant on fisheries management issues, member of Norwegian delegation to FAO Fisheries Committee (COFI), member, Scientific Assessment Team, Arctic Climate Impact Assessment, member of the IUCN Working Group on Sustainable Use and a member of the Norwegian delegation to UN informal consultation process on oceans

### 10.4 Previous certification evaluations

The fishery has not been previously assessed against the MSC standard, although the offshore fishery outside of 12 nm has been certified.

## 10.5 Inspections of the Fishery

Inspection of the fishery focused on the practicalities of fishing operations, the mechanisms and effectiveness of management agencies and the scientific assessment of the fisheries.

Meetings were held as follows. Some of the key issues discussed have been identified for each meeting.

Name	Affiliation	Date	Key Issues
Thorbjorn Thorvik Peter Guillested  Asegir Aglen	Fiskeridirektoratet, Bergen  Institute of Marine Research, Bergen	10/02/09	Scientific assessment of fishery. Ecosystem interactions and management effectiveness.
Nina Jensen	WWF	10/02/09	Ecosystem interactions and management effectiveness.
Rigmor Abel Jorulf Straume Charles Aas Jorn Pedersen Webjorn Barstad Arild Aarvik Tore Roaldsnes Tor-Edgar Ripman Jan Hansen Tommy Wixeroy Charles Ingebrigsten	NSEC Norwegian Seafood Federation Troms Fiskar Fylking Norwegian Fishermans Association Fiskebat Fiskebat Fiskebat Norges Rafisklag Troms Fiskar Fylking Troms Fiskar Fylking Control Manager	11/02/09	Fishing operations Ecosystem interactions Management effectiveness and enforcement.
Sverre Johansen  Anne Magnussen  Vegard Haukeland	Deputy Director General, Ministry of Fisheries & Coastal affairs, Oslo  Senior Advisor, Ministry of Fisheries & Coastal affairs, Oslo	18/02/09	Management effectiveness and enforcement.

## 11 STAKEHOLDER CONSULTATION

### 11.1 Stakeholder Consultation

A total of 19 stakeholders were identified and consulted specifically by Moody Marine. Information was also made publicly available at the following stages of the assessment:

Date	Purpose	Media
03/09/08	Announcement of assessment	Direct E-mail/letter Notification on MSC website Advertisement in press
22/10/08	Notification of Assessment Team nominees	Direct E-mail Notification on MSC website
04/08/08	Notification of intent to use MSC	Direct E-mail

<b>Date</b>	<b>Purpose</b>	<b>Media</b>
	FAM Standard Assessment Tree	Notification on MSC website
08/01/09	Notification of assessment visit and call for meeting requests	Direct E-mail Notification on MSC website
09-11/02/09	Assessment visit	Meetings
27/10/09	Notification of Proposed Peer Reviewers	Direct E-mail Notification on MSC website
14/1/11	Announcement of resumption of assessment of inshore fishery – call for stakeholder input.	Direct E-mail Notification on MSC website
2/8/11	Notification of Public Draft Report	Direct E-mail Notification on MSC website
	Notification of Final Report	Direct E-mail Notification on MSC website

## 11.2 Stakeholder Issues

The following issues have been raised by stakeholders during the course of this certification assessment (see Appendix D for details on comments):

- **Impacts of trawling upon deep water coral reefs**
- **IUU-** there is suggestion of non-compliance to the TAC regulations resulting in a significant amount of unreported landings.
- **Bycatch** in relation to the coastal cod and redfish populations
- **Discards-** although illegal in Norwegian waters, discarding of cod, haddock and saithe may be significant during some periods.

These issues have been considered as part of this assessment and where relevant, have been detailed within the appropriate scoring tables and report text.

## 12 OBSERVATIONS AND SCORING

### 12.1 Introduction to scoring methodology

The MSC Principles and Criteria set out the requirements of certified fishery. These Principles and Criteria have been developed into a standard (Fishery Assessment Methodology) assessment tree - Performance Indicators and Scoring Guideposts - by the MSC, which is used in this assessment.

The Performance Indicators (PIs) have been released on the MSC website. In order to make the assessment process as clear and transparent as possible, each PI has three associated Scoring Guideposts (SGs) which identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Performance Indicator; 100 represents a theoretically ideal level of performance and 60 a measurable shortfall.

For each Performance Indicators, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no Indicator should score less than 60. As it is not considered possible to allocate precise scores, a scoring interval of five is used in evaluations. As this represents a relatively crude level of scoring, average scores for each Principle are rounded to the nearest whole number.

Weights and scores for the Fishery are presented in the scoring table (Appendix A).

## **13 LIMIT OF IDENTIFICATION OF LANDINGS FROM THE FISHERY**

### **Traceability**

Traceability provisions are through the accurate recording of all fishing positions through logbook/landing declaration records and/or contract note. As fish outside of 12nm are already certified, certification of this inshore fishery will mean that any additional measures to separate offshore and inshore catches will no longer be required

### **At-Sea processing**

Larger vessels within the trawl and long-line fleets undertake processing on board of the cod into frozen headed/gutted blocks and/or frozen fillets. All of the onboard processing results in products which are clearly identified with batch numbers, identifying the vessel, area of catch and the species. The rest of the fleet land the unprocessed catch at designated Norwegian landing points. Contract notes accompany product record all relevant information, ensuring traceability.

### **Points of Landing**

Prescribed points of landing are designated Norwegian landing points at which recording of catches is carried out. At these points, contract notes are produced (or transmitted electronically) providing information on the fish species, weight landed, and time of landing. The data are submitted to the fishermen's sales organisation which then transfers them to the Fisheries Directorate. The Directorate, in turn, checks these figures against the quotas that vessels have allocated to them. Norges råfisklag has a comprehensive system for following up on catches and landings record. Traceability is therefore assured to the point of landing, from which product would enter Chain of Custody.

### **Eligibility to enter Chain of Custody**

Products from the certified fishery, and with appropriate traceability provisions, are eligible to enter future Chain of Custody and carry the MSC logo. Any companies buying from this fishery must have CoC certification. Land-based processing sites must have separate CoC certification. Certification applies to the entire Norwegian Fleet fishing within the defined Units of Certification (see Appendix E).

Please note, the target eligibility date for product from the fishery (as and when certified) to bear the MSC label is confirmed as **4 February 2011**. The fishery has no seasonality, and so the TED is set at 6 months prior to the release of the PCD Report. Recording of landings is well monitored in Norway and most Norwegian processing and trading companies already have Chain of Custody certification; traceability systems are therefore well established.

## **HARMONISATION WITH OTHER FISHERIES TARGETING SAME STOCK**

The first fishery targeting this stock to be certified was the Moody Marine assessment of the Norwegian offshore cod and haddock fisheries. The subsequent FCI assessment of the 'Barents Sea cod' fishery (Russian and Norwegian) harmonised with this original Norwegian assessment. The current Norwegian Inshore fishery assessment is based on (and so also harmonised with) the offshore fishery, the only differences being specific differences associated with fishing in inshore waters, particularly the issue of coastal cod bycatch. All fisheries are therefore harmonised with the original assessment (Norwegian offshore cod and haddock).

## **14 ASSESSMENT RESULTS**

The Performance of the Fishery in relation to MSC Principles 1, 2 and 3 is summarised below:

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Trawl**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

Prin- ciple (L1)	Wt (L2)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt		Weight in	Score	Contribution to Principle		
						Either (L3)	Or			Either	Or	
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	80	20.00	13.33
				1.1.3	Stock rebuilding			0.333	0.1667		0.00	0.00
	Management	0.5	1.2.1	Harvest strategy	0.25	0.125			100	12.50	12.50	
			1.2.2	Harvest control rules & tools	0.25	0.125			90	11.25	11.25	
			1.2.3	Information & monitoring	0.25	0.125			85	10.63	10.63	
			1.2.4	Assessment of stock status	0.25	0.125			90	11.25	11.25	
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			70	4.67	4.67
				2.1.2	Management	0.333	0.0667			85	5.67	5.67
				2.1.3	Information	0.333	0.0667			85	5.67	5.67
	Bycatch	0.2	2.2.1	Outcome	0.333	0.0667			100	6.67	6.67	
			2.2.2	Management	0.333	0.0667			95	6.33	6.33	
			2.2.3	Information	0.333	0.0667			80	5.33	5.33	
	ETP species	0.2	2.3.1	Outcome	0.333	0.0667			75	5.00	5.00	
			2.3.2	Management	0.333	0.0667			85	5.67	5.67	
			2.3.3	Information	0.333	0.0667			80	5.33	5.33	
	Habitats	0.2	2.4.1	Outcome	0.333	0.0667			75	5.00	5.00	
			2.4.2	Management	0.333	0.0667			95	6.33	6.33	
			2.4.3	Information	0.333	0.0667			95	6.33	6.33	
	Trophic function	0.2	2.5.1	Outcome	0.333	0.0667			100	6.67	6.67	
			2.5.2	Management	0.333	0.0667			95	6.33	6.33	
			2.5.3	Information	0.333	0.0667			90	6.00	6.00	
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			95	11.88	11.88
				3.1.2	Consultation, roles &	0.25	0.125			95	11.88	11.88
				3.1.3	Long term objectives	0.25	0.125			95	11.88	11.88
				3.1.4	Incentives for sustainable fishing	0.25	0.125			95	11.88	11.88
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	9.00	
			3.2.2	Decision making processes	0.2	0.1			95	9.50	9.50	
			3.2.3	Compliance & enforcement	0.2	0.1			95	9.50	9.50	
			3.2.4	Research plan	0.2	0.1			90	9.00	9.00	
			3.2.5	Management performance	0.2	0.1			95	9.50	9.50	
<b>Overall weighted Principle-level scores</b>										Either	Or	
Principle 1 - Target species						Stock rebuilding PI not scored				90.63		
						Stock rebuilding PI scored					75.63	
Principle 2 - Ecosystem										87.00		
Principle 3 - Management										94.00		

MSC Principle	Fishery Performance
<b>Principle 1: Sustainability of Exploited Stock</b>	Overall : <b>90.6 PASS</b>
<b>Principle 2: Maintenance of Ecosystem</b>	Overall : <b>87.0 PASS</b>
<b>Principle 3: Effective Management System</b>	Overall : <b>94.0 PASS</b>

**The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore determined that the Norwegian**

**North East Arctic Inside of the Norwegian 12 nm limit Haddock Trawl Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Long-line**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt		Weight in	Score	Contribution to Principle					
						(L3)				Either	Or	Either	Or		
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67			
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	80	20.00	13.33			
				1.1.3	Stock rebuilding					0.333	0.1667		0.00	0.00	
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125				100	12.50	12.50		
				1.2.2	Harvest control rules & tools	0.25	0.125				90	11.25	11.25		
				1.2.3	Information & monitoring	0.25	0.125				85	10.63	10.63		
				1.2.4	Assessment of stock status	0.25	0.125				90	11.25	11.25		
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			70	4.67	4.67			
				2.1.2	Management	0.333	0.0667				85	5.67	5.67		
				2.1.3	Information	0.333	0.0667				85	5.67	5.67		
		Bycatch	0.2	2.2.1	Outcome	0.333	0.0667				100	6.67	6.67		
				2.2.2	Management	0.333	0.0667				95	6.33	6.33		
				2.2.3	Information	0.333	0.0667				80	5.33	5.33		
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667				75	5.00	5.00		
				2.3.2	Management	0.333	0.0667				85	5.67	5.67		
				2.3.3	Information	0.333	0.0667				80	5.33	5.33		
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667				75	5.00	5.00		
				2.4.2	Management	0.333	0.0667				95	6.33	6.33		
				2.4.3	Information	0.333	0.0667				95	6.33	6.33		
		Trophic function	0.2	2.5.1	Outcome	0.333	0.0667				100	6.67	6.67		
				2.5.2	Management	0.333	0.0667				95	6.33	6.33		
				2.5.3	Information	0.333	0.0667				90	6.00	6.00		
		Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			95	11.88	11.88	
						3.1.2	Consultation, roles &	0.25	0.125				95	11.88	11.88
						3.1.3	Long term objectives	0.25	0.125				95	11.88	11.88
3.1.4	Incentives for sustainable fishing					0.25	0.125				95	11.88	11.88		
Fishery specific management system	0.5			3.2.1	Fishery specific objectives	0.2	0.1				90	9.00	9.00		
				3.2.2	Decision making processes	0.2	0.1				95	9.50	9.50		
				3.2.3	Compliance & enforcement	0.2	0.1				95	9.50	9.50		
				3.2.4	Research plan	0.2	0.1				90	9.00	9.00		
				3.2.5	Management performance	0.2	0.1				95	9.50	9.50		
<b>Overall weighted Principle-level scores</b>										Either	Or				
Principle 1 - Target species						Stock rebuilding PI not scored				90.63					
						Stock rebuilding PI scored					75.63				
Principle 2 - Ecosystem										87.00					
Principle 3 - Management										94.00					

MSC Principle	Fishery Performance
<b>Principle 1:</b> Sustainability of Exploited Stock	Overall : <b>90.6 PASS</b>
<b>Principle 2:</b> Maintenance of Ecosystem	Overall : <b>87.0 PASS</b>
<b>Principle 3:</b> Effective Management System	Overall : <b>94.0 PASS</b>

MSC Principle	Fishery Performance

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore determined that the Norwegian North East Arctic Inside of the Norwegian 12 nm limit Haddock Longline Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: Inside of the Norwegian 12 nm limit  
**Method of Capture:** Gill-net  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt		Weight		Score	Contribution			
						(L3)	in	in	in		to Principle	to Principle		
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67		
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	80	20.00	13.33		
				1.1.3	Stock rebuilding					0.333	0.1667		0.00	0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125					100	12.50	12.50
				1.2.2	Harvest control rules & tools	0.25	0.125					90	11.25	11.25
				1.2.3	Information & monitoring	0.25	0.125					85	10.63	10.63
				1.2.4	Assessment of stock status	0.25	0.125					90	11.25	11.25
		Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			70	4.67	4.67
2.1.2	Management					0.333	0.0667			85	5.67	5.67		
2.1.3	Information					0.333	0.0667			85	5.67	5.67		
Bycatch	0.2			2.2.1	Outcome	0.333	0.0667			100	6.67	6.67		
				2.2.2	Management	0.333	0.0667			95	6.33	6.33		
				2.2.3	Information	0.333	0.0667			80	5.33	5.33		
ETP species	0.2			2.3.1	Outcome	0.333	0.0667			75	5.00	5.00		
				2.3.2	Management	0.333	0.0667			85	5.67	5.67		
				2.3.3	Information	0.333	0.0667			80	5.33	5.33		
Habitats	0.2			2.4.1	Outcome	0.333	0.0667			75	5.00	5.00		
				2.4.2	Management	0.333	0.0667			95	6.33	6.33		
				2.4.3	Information	0.333	0.0667			95	6.33	6.33		
Trophic function	0.2			2.5.1	Outcome	0.333	0.0667			100	6.67	6.67		
				2.5.2	Management	0.333	0.0667			95	6.33	6.33		
				2.5.3	Information	0.333	0.0667			90	6.00	6.00		
Three	1			Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			95	11.88	11.88
						3.1.2	Consultation, roles &	0.25	0.125			95	11.88	11.88
						3.1.3	Long term objectives	0.25	0.125			95	11.88	11.88
		3.1.4	Incentives for sustainable fishing			0.25	0.125			95	11.88	11.88		
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	9.00		
				3.2.2	Decision making processes	0.2	0.1			95	9.50	9.50		
				3.2.3	Compliance & enforcement	0.2	0.1			95	9.50	9.50		
				3.2.4	Research plan	0.2	0.1			90	9.00	9.00		
				3.2.5	Management performance	0.2	0.1			95	9.50	9.50		
<b>Overall weighted Principle-level scores</b>										Either	Or			
Principle 1 - Target species						Stock rebuilding PI not scored				90.63				
						Stock rebuilding PI scored					75.63			
Principle 2 - Ecosystem										87.00				
Principle 3 - Management										94.00				

MSC Principle	Fishery Performance
<b>Principle 1: Sustainability of Exploited Stock</b>	<b>Overall : 90.6 PASS</b>

MSC Principle	Fishery Performance
<b>Principle 2: Maintenance of Ecosystem</b>	Overall : <b>87.0 PASS</b>
<b>Principle 3: Effective Management System</b>	Overall : <b>94.0 PASS</b>

**The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore determined that the Norwegian North East Arctic Inside of the Norwegian 12 nm limit Haddock Gill-net Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Danish Seine**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt		Score	Contribution to Principle			
						(L3)	in		Either	Or		
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	80	20.00	13.33
				1.1.3	Stock rebuilding			0.333	0.1667		0.00	0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125			100	12.50	12.50
				1.2.2	Harvest control rules & tools	0.25	0.125			90	11.25	11.25
				1.2.3	Information & monitoring	0.25	0.125			85	10.63	10.63
				1.2.4	Assessment of stock status	0.25	0.125			90	11.25	11.25
		Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			70
2.1.2	Management					0.333	0.0667			85	5.67	5.67
2.1.3	Information					0.333	0.0667			85	5.67	5.67
Bycatch	0.2		2.2.1	Outcome	0.333	0.0667			100	6.67	6.67	
			2.2.2	Management	0.333	0.0667			95	6.33	6.33	
			2.2.3	Information	0.333	0.0667			80	5.33	5.33	
ETP species	0.2		2.3.1	Outcome	0.333	0.0667			75	5.00	5.00	
			2.3.2	Management	0.333	0.0667			85	5.67	5.67	
			2.3.3	Information	0.333	0.0667			80	5.33	5.33	
Habitats	0.2		2.4.1	Outcome	0.333	0.0667			90	6.00	6.00	
			2.4.2	Management	0.333	0.0667			95	6.33	6.33	
			2.4.3	Information	0.333	0.0667			95	6.33	6.33	
Trophic function	0.2		2.5.1	Outcome	0.333	0.0667			100	6.67	6.67	
			2.5.2	Management	0.333	0.0667			95	6.33	6.33	
			2.5.3	Information	0.333	0.0667			90	6.00	6.00	
Three	1		Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			95	11.88
		3.1.2			Consultation, roles &	0.25	0.125			95	11.88	11.88
		3.1.3			Long term objectives	0.25	0.125			95	11.88	11.88
		3.1.4			Incentives for sustainable fishing	0.25	0.125			95	11.88	11.88
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	9.00	
			3.2.2	Decision making processes	0.2	0.1			95	9.50	9.50	
			3.2.3	Compliance & enforcement	0.2	0.1			95	9.50	9.50	
			3.2.4	Research plan	0.2	0.1			90	9.00	9.00	
			3.2.5	Management performance	0.2	0.1			95	9.50	9.50	
<b>Overall weighted Principle-level scores</b>									Either	Or		
Principle 1 - Target species						Stock rebuilding PI not scored			90.63			
						Stock rebuilding PI scored				75.63		
Principle 2 - Ecosystem									88.00			
Principle 3 - Management									94.00			

<b>MSC Principle</b>	<b>Fishery Performance</b>
<b>Principle 1:</b> Sustainability of Exploited Stock	Overall : <b>90.6 PASS</b>
<b>Principle 2:</b> Maintenance of Ecosystem	Overall : <b>88.0 PASS</b>
<b>Principle 3:</b> Effective Management System	Overall : <b>94.0 PASS</b>

**The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore determined that the Norwegian North East Arctic Inside of the Norwegian 12 nm limit Haddock Danish Seine Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

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**Species:** North East Arctic Haddock, *Melanogrammus aeglefinus*  
**Geographical Area:** ICES Sub-Areas I and II: **Inside of the Norwegian 12 nm limit**  
**Method of Capture:** **Hook and Line**  
**Management System:** Norwegian-Russian Fisheries Commission & Norwegian Authorities  
**Client Group:** Norwegian Fleet

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Weight in				Score	Contribution to Principle			
						Wt (L3)	Wt (L3)	Or	Or		Either	Or		
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67		
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	80	20.00	13.33		
				1.1.3	Stock rebuilding					0.333	0.1667	0.00	0.00	
	Management	0.5	1.2.1	Harvest strategy	0.25	0.125				100	12.50	12.50		
			1.2.2	Harvest control rules & tools	0.25	0.125				90	11.25	11.25		
			1.2.3	Information & monitoring	0.25	0.125				85	10.63	10.63		
			1.2.4	Assessment of stock status	0.25	0.125				90	11.25	11.25		
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			70	4.67	4.67		
				2.1.2	Management	0.333	0.0667				85	5.67	5.67	
				2.1.3	Information	0.333	0.0667				85	5.67	5.67	
	Bycatch	0.2	2.2.1	Outcome	0.333	0.0667				100	6.67	6.67		
			2.2.2	Management	0.333	0.0667				95	6.33	6.33		
			2.2.3	Information	0.333	0.0667				80	5.33	5.33		
	ETP species	0.2	2.3.1	Outcome	0.333	0.0667				85	5.67	5.67		
			2.3.2	Management	0.333	0.0667				85	5.67	5.67		
			2.3.3	Information	0.333	0.0667				80	5.33	5.33		
	Habitats	0.2	2.4.1	Outcome	0.333	0.0667				95	6.33	6.33		
			2.4.2	Management	0.333	0.0667				95	6.33	6.33		
			2.4.3	Information	0.333	0.0667				95	6.33	6.33		
	Trophic function	0.2	2.5.1	Outcome	0.333	0.0667				100	6.67	6.67		
			2.5.2	Management	0.333	0.0667				95	6.33	6.33		
			2.5.3	Information	0.333	0.0667				90	6.00	6.00		
	Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			95	11.88	11.88	
					3.1.2	Consultation, roles &	0.25	0.125				95	11.88	11.88
					3.1.3	Long term objectives	0.25	0.125				95	11.88	11.88
					3.1.4	Incentives for sustainable fishing	0.25	0.125				95	11.88	11.88
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1				90	9.00	9.00	
				3.2.2	Decision making processes	0.2	0.1				95	9.50	9.50	
3.2.3				Compliance & enforcement	0.2	0.1				95	9.50	9.50		
3.2.4				Research plan	0.2	0.1				90	9.00	9.00		
3.2.5				Management performance	0.2	0.1				95	9.50	9.50		
<b>Overall weighted Principle-level scores</b>										Either	Or			
Principle 1 - Target species						Stock rebuilding PI not scored				90.63				
						Stock rebuilding PI scored					75.63			
Principle 2 - Ecosystem										89.00				
Principle 3 - Management										94.00				

MSC Principle	Fishery Performance
<b>Principle 1:</b> Sustainability of Exploited Stock	Overall : <b>90.6 PASS</b>
<b>Principle 2:</b> Maintenance of Ecosystem	Overall : <b>89.0 PASS</b>
<b>Principle 3:</b> Effective Management System	Overall : <b>94.0 PASS</b>

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. It is therefore determined that the Norwegian North East Arctic Inside of the Norwegian 12 nm limit Haddock Hook and Line Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

### 14.1 Conditions

As a standard requirement of the MSC certification methodology, the fishery shall be subject to (as a

minimum) annual surveillance audits. These audits shall be publicised and reports made publicly available.

The fishery attained a score of below 80 against 3 Performance Indicators. The assessment team has therefore set conditions for continuing certification that the client for certification is required to address. The conditions are applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

As a standard condition of certification, the client shall develop an 'Action Plan' for Meeting the Conditions for Continued Certification', to be approved by Moody Marine.

The conditions are associated with three key areas of performance of the fishery. The Conditions, associated timescales and relevant Scoring Indicator are set out below.

### Condition 1

PI 2.1.1	Retained Species Status
PI	The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.
SG 60	Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.
SG 80	Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.
SG 100	There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.
Scoring	70 (all fisheries)
Rationale	For coastal cod and redfish there are strategies or partial strategies in place to ensure the fishery does not hinder recovery and rebuilding of any populations outside of biological limits. For elasmobranchs there are measures in place. In the case of coastal cod in particular, specific recovery plans are being implemented which are expected (through simulation) to be effective, but currently insufficient time has elapsed for practical evidence that these measures are effective to be gained.
Condition	The fishery must meet the overall SG80 requirement within the timescale of this certification, i.e. <i>Main retained species should be highly likely to be within biologically based limits, or if outside the limits there should be a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.</i>  <b>Timescale:</b> Initial evaluation of any potential impacts should at least be planned by the first surveillance audit, underway by the second surveillance audit and completed by the third audit. Where further mitigation measures are required to reduce or avoid impacts, these should be identified within 3 years of certification and implemented by the fourth surveillance audit.  In meeting this condition, the client should note the following specific issues: 1. To assess the impacts of catches of non-target species in relation to the distribution, ecology and abundance of the species and populations affected,

	<p>notably for elasmobranchs. For coastal cod it is noted that a strategy is in place to allow for recovery and rebuilding, the rebuilding progress will be monitored and reported at subsequent annual MSC surveillance audits. Further action, such as in-season monitoring of coastal cod catch rates and subsequent management action, may be required and this will be discussed as needed during future audits.</p> <ol style="list-style-type: none"> <li>2. The potential impact of non-target species removals on the populations affected and the wider ecosystem should be evaluated.</li> <li>3. Where assessments of impacts on these species are shown to be significant, appropriate measures to reduce catches to acceptable and precautionary levels shall be developed and implemented.</li> </ol>
Client Action Plan	See Appendix B
Consultation on condition	See Appendix B

### Condition 2

<b>2.3.1</b>	<b>Endangered, Threatened and Protected (ETP) species</b>
PI	<p><b>Status:</b> The fishery meets national and international requirements for protection of ETP species.</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.</p>
SG 60	<p>Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.</p> <p>Known direct effects are unlikely to create unacceptable impacts to ETP species.</p>
SG 80	<p>The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.</p> <p>Direct effects are highly unlikely to create unacceptable impacts to ETP species.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p>
SG 100	<p>There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.</p> <p>There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species.</p>
Scoring	75 (Condition not apply to Hook and Line Fishery)
Rationale	The assessment notes the general lack of knowledge on fishery gear specific impacts on ETP species.
Condition	<p>The fishery must meet the overall SG80 requirement within the timescale of this certification, i.e. <i>The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Direct effects are highly unlikely to create unacceptable impacts to ETP species. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</i></p> <p>Timescale: A review of interactions should be completed, and any significant interactions identified by the first annual surveillance audit. Appropriate mitigation measures should be implemented by the second annual surveillance audit.</p> <p>In meeting this condition, the client should note the following specific issues:</p> <ol style="list-style-type: none"> <li>1. The information now collected from the fishery under new regulations and programmes should be examined to quantify the extent of interactions. Where interactions are found to be unacceptable the fleet should implement</li> </ol>

	appropriate actions (e.g. formalisation of the use of bird-scaring devices) to minimise interactions or eliminate mortalities of these species.
Client Action Plan	See Appendix B
Consultation on condition	See Appendix B

**Condition 3**

<b>PI 2.4.1</b>	<b>Habitat</b>
PI	<b>Status</b> The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.
SG 60	The fishery is <u>unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.
SG 80	The fishery is <u>highly unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.
SG 100	There is <u>evidence</u> that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
Scoring	Demersal Trawl: <b>75</b> Danish seine: <b>75</b> Longlines: <b>75</b> Gillnets: <b>75</b>
Rationale	Insufficient information exists for certain gear types – trawl, Danish seine, longlines and gill-nets - as to their effect on sensitive habitat types. It is therefore not possible to determine that these fisheries are highly unlikely to significantly affect such habitats
Condition	<p>The trawl, Danish seine, longline and gill-net fisheries must meet the overall SG80 requirement within the timescale of this certification, i.e. <i>The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.</i></p> <p>Timescale: An assessment should be planned by the first surveillance audit, underway by the second surveillance audit and completed by the third audit. The identification and implementation of appropriate management measures for each gear type should be undertaken within the term of the current certification.</p> <p>In meeting this condition, the client should note the following specific issues:</p> <ol style="list-style-type: none"> <li>1. An assessment of the potential impact of trawl, Danish seine, longline and gill net fishing within known sensitive habitats, notably identified areas of cold water coral, should be undertaken. If a potentially significant impact is identified, an appropriate management action should be implemented. It is noted that vessels may voluntarily avoid such areas; formalisation of such procedures may be one appropriate mechanism to address this.</li> </ol>
Client Action Plan	See Appendix B
Consultation on condition	See Appendix B

## **APPENDICES**

**Appendix A: Scoring Table**

**Appendix B: Client Action Plan**

**Appendix C: Peer Review Reports**

- 1. Peer Reviewer Biographies**
- 2. Peer Review Report A**
- 3. Peer Review Report B**

**Appendix D: Stakeholder Comments.** *Note, no additional stakeholder comments were received prior to publication of this Public Comment Draft Report.*

**Appendix E: Registered vessels fishing eligible to trade MSC certified Haddock.**

**Appendix F: Stakeholder Comments on Public Comment Draft Report**

## **APPENDIX A: SCORING TABLE**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Principle 1</b>	<b>A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.</b>
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<b>1.1</b>	<b>Management Outcomes:</b>
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<b>1.1.1</b>	<b>Stock Status:</b> The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	It is <u>likely</u> that the stock is above the point where recruitment would be impaired.	It is <u>highly likely</u> that the stock is above the point where recruitment would be impaired.  The stock is at or fluctuating around its target reference point.	There is a <u>high degree of certainty</u> that the stock is above the point where recruitment would be impaired.  There is a <u>high degree of certainty</u> that the stock has been fluctuating around its target reference point, or has been above its target reference point, <u>over recent years</u> .
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**Scoring Comments**

**There is a high degree of certainty that the stock is above the point where recruitment would be impaired.**

The stock is subject to intense annual monitoring through catch sampling and research vessel surveys. All available data in recent years underpins a high degree of certainty that the stock is above the point where recruitment might be impaired ( $B_{lim}$ ), given it has been above  $B_{pa}$  and  $B_{MSY}$  since 1989 and is currently above historical record levels. This fulfils the requirements of the first scoring issue under SG100.

**There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.**

No doubt in recognition of the inherently sporadic nature of good recruitment, the lowest acceptable reference point for this fishery is  $F_{pa}$ . However, new research using long-term stochastic simulations has led to an agreed  $F_{MSY}$ , equal to the previous  $F_{pa}$  level used in the management plan. Fishing mortality has been around  $F_{MSY}$  since the mid 1990s. This is considered to meet the requirements of SG100, given the period over which it has fluctuated around this level (see FAM v2 paragraph 6.2.9). ICES has concluded that this strategy is consistent with a precautionary approach and that the fishery is being exploited at a sustainable level.

**Score: 100 (All Units of Certification UoC)**

All SG100 requirements are met

Audit Trace References

ICES AFWG, 2010, 2011a; ACOM, 2010a, ACOM, 2011a

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.2	<p><b>Reference Points:</b> Limit and target reference points are appropriate for the stock.</p>	<p><u>Generic</u> limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.</p>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome.</p> <p>For low trophic level species, the target reference point takes into account the ecological role of the stock.</p>	<p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant <u>precautionary issues</u>.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome, <u>or a higher level</u>, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p>
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Scoring Comments
<p><b>Reference points are appropriate for the stock and can be estimated.</b>            Biological reference points are appropriate for the stock and can be estimated: a biomass limit reference point has been established using stock-recruit data as the point where impaired recruitment is likely, and <math>B_{PA}</math> has been set at a level above <math>B_{lim}</math> taking uncertainty into account. (SG80)</p> <p><b>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</b>            On the basis of more than half a century of stock assessment estimates, and an even longer time series of biological sampling and stock monitoring, there is confidence that the limit reference points are set at appropriate levels to minimise the risk of any impairment to reproductive potential or recruitment. The limit reference point (<math>B_{lim}</math>) is set above the level at which there is an appreciable risk of impairing reproductive capacity, and based on reasonable practice, but does not have extra precaution built in. <math>B_{pa}</math> is used as the current target, which stochastic simulations indicate is consistent with <math>MSY</math>, while <math>B_{lim}</math> is the reference point used as the LRP. Consistent with MSC PA12, this means that on the second scoring issue, the 80 level is achieved, but the 100 level is not.</p> <p><b>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome.</b>            The current, internationally agreed management plan and harvest control rule is couched in terms that aim to maintain the fishing mortality at the <math>F_{pa}</math> level (<math>F=0.35</math>) and hence</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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on average stock biomass at  $B_{pa}$ , which is  $1.67 * B_{lim}$ . ICES has endorsed the harvest control rule as meeting the precautionary approach to stock management. The newly defined MSY reference point is equivalent to the long-term target reference point in the harvest control rule (the  $F_{pa}$  value), and has led to the 'maintenance of high long-term yields', with SSB reaching levels above historic highs. This fulfils the requirements of the third scoring issue under SG80 (since the HCR aims to maintain the fishery at MSY, not a higher level).

Haddock is not considered a low trophic level species (Fishbase trophic level ~ 4.1, based upon diet studies). Therefore the fourth SG80 issue is not assigned a score.

**Score: 80 (All UoCs)**

All SG80 requirements are met, but no SG100.

Audit Trace References

ICES AFWG, 2011a; ACOM, 2010a

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.3	<p><b>Stock Rebuilding:</b> Where the stock is depleted, there is evidence of stock rebuilding.</p>	<p>Where stocks are depleted rebuilding strategies which have a <u>reasonable expectation</u> of success are in place.</p> <p>Monitoring is in place to determine whether they are effective in rebuilding the stock within a <u>specified</u> timeframe.</p>	<p>Where stocks are depleted rebuilding strategies are in place.</p> <p>There is <u>evidence</u> that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a <u>specified</u> timeframe.</p>	<p>Where stocks are depleted, strategies are <u>demonstrated</u> to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the <u>shortest practicable</u> timeframe.</p>
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<b>Scoring Comments</b>
N/A
Score:
<b>Audit Trace References</b>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2	<b>Harvest Strategy (management)</b>		
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1.2.1	Harvest Strategy: There is a robust and precautionary harvest strategy in place	<p>The harvest strategy is <u>expected</u> to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy is <u>likely</u> to work based on prior experience or plausible argument.</p> <p><u>Monitoring</u> is in place that is expected to determine whether the harvest strategy is working.</p>	<p>The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy <u>work together</u> towards achieving management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy may not have been fully tested but monitoring is in place and <u>evidence</u> exists that it is achieving its objectives.</p>	<p>The harvest strategy is responsive to the state of the stock and is <u>designed</u> to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The performance of the harvest strategy has been <u>fully evaluated</u> and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.</p> <p>The harvest strategy is <u>periodically reviewed and improved</u> as necessary.</p>
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<b>Scoring Comments</b>
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**The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.**  
The improved stock status in recent years indicates that the harvest strategy is indeed responsive to the state of the stock and looks set to achieve stock management objectives reflected in the target and limit reference points, including MSY values.  $B_{pa}$  is defined relative to the  $F_{pa}$  level.

**The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels**  
The harvest strategy has been subject to rigorous review and theoretical assessment by simulation modelling, including uncertainties associated with environmental variability, and can now be said to be “fully evaluated”. Evidence available to date, including the stock trajectory, indicates that it is achieving its objectives.

**The harvest strategy is periodically reviewed and improved as necessary.**  
In line with all aspects of major fish stock assessments, methods and management advice, ICES undertakes annual reviews of the strategy as a routine and can be expected to subject it to more significant scrutiny if it appears to be falling short of expectations. These reviews will include advice as appropriate for improvements as they become necessary. The year-on-year performance will also be subject to annual scrutiny by the Norway–Russia management bodies, the industry at large and other bodies with an interest in the stability and welfare of the NE Arctic ecosystem. The management strategy was amended in 2007, moving from a three-year rule to a one-year rule on the basis of the HCR evaluation conducted by ICES. ICES evaluated the modified plan, and concluded it was in accordance with the precautionary principle. This is consistent with the requirements at the SG100 level. The year-on-year performance will also be subject to annual scrutiny by the Norway–Russia management bodies, the industry at large and

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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other bodies with an interest in the stability and welfare of the NE Arctic ecosystem.
<b>Score: 100 (All UoCs)</b>
The harvest strategy has been evaluated through simulation on two separate occasions, and has been updated in light of new information. In turn, the trajectory of the population contributes to evidence that the strategy is achieving its objectives. All of the SG100 requirements are met.
<b>Audit Trace References</b>
AFWG, 2010; ACOM, 2010a,

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
1.2.2	Harvest control rules and tools: There are well defined and effective harvest control rules in place	<p><u>Generally understood</u> harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.</p> <p>There is <u>some evidence</u> that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.</p>	<p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>The <u>selection</u> of the harvest control rules takes into account the <u>main</u> uncertainties.</p> <p><u>Available evidence indicates</u> that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules</p>

Scoring Comments
<p><b><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</b></p> <p>The rules underpinning the harvest control strategy are clearly defined and well understood. These rules are expressed in terms that will reduce the exploitation rate if and when limit references points appear to be, or are under threat. Arguably, the greatest weakness within the rules are the provisions for 25% inter annual variation in TAC and the rule relating cuts in F relative to SSB at zero rather than a more “precautionary” level consistent with Blim. Such short comings might permit fishing to continue, within the harvest control rules, to the point of stock extinction. However, this is somewhat offset by the fact that the 25% limit on inter-annual TAC variability is eliminated at SSB levels below Bpa, with the aim of setting TACs that return the stock to the Bpa level. ICES tests of the HCR have found it to be consistent with the precautionary approach.</p> <p><b><u>The selection of the harvest control rules takes into account the main uncertainties.</u></b></p> <p>The annual ICES stock assessments take into account a variety of uncertainties, not the least of which was IUU, and model their potential effects on estimates of stock status and, hence, management advice. As noted, the precautionary reference points used take account of uncertainty relative to the limit reference points, while also corresponding to MSY levels based upon stochastic simulation results. In this sense, uncertainty is taken into account within the harvest control rules, while separate actions have reduced IUU to near zero in 2009. The treatment of uncertainty is not expressed explicitly within the HCR, and while the testing of the rule has encompassed the main uncertainties, and while the harvest control rule has been designed for the stock in question, the range of uncertainties tested cannot be said to be 'wide'.</p> <p><b><u>Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules</u></b></p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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The management plan was implemented in 2004, since when SSB has reached a historical high, and fishing mortality has been reduced below the target level. This provides evidence that the tools are effective in achieving the exploitation levels required.

Score: **90 (All UoCs)**

While the harvest control rule appears effective, evidenced by the trends in SSB and fishing mortality since its implementation, the integration of environmental and ecological uncertainties is currently limited. However, all of the SG80 requirements are met, and most of the SG100 requirements.

Audit Trace References

ICES AFWG, 2010; ACOM, 2010a

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2.3	<p><b>Information / monitoring:</b> Relevant information is collected to support the harvest strategy</p>	<p><u>Some</u> relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.</p>	<p><u>Sufficient</u> relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u>, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.</p> <p>There is good information on all other fishery removals from the stock.</p>	<p>A <u>comprehensive range</u> of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.</p> <p><u>All information</u> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent <u>uncertainties</u> in the information [data] and the robustness of assessment and management to this uncertainty.</p>
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**Scoring Comments**

**A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.**

The body of data, both biological and environmental, that has been built in support of this fishery and stock assessment is probably second to none. Stock structure and abundance is monitored through fishery independent surveys, as well as by the reference fleet, along with fishery removal data collection from the fishery itself on landing and at sea. Fleet composition is regularly updated. Environmental and ecosystem information are routinely collected and analysed (see Principle 2), going far beyond that information needed directly for the harvest control rule. In turn, since 2005, a reference fleet of coastal vessels, mainly gillnetters, provide regular sampling data for length, age, and stock separation. These data are used to estimate catch-at-age for the corresponding fleets. In addition, when fishing between the 4- and 6-mile lines the freshfish trawlers provide otoliths for cod stock separation. **SG100 met.**

**Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule./ There is good information on all other fishery removals from the stock.**

The principal flaw in the data set has historically been illegal, unregulated and unreported (IUU) catches and landings. In the latter part of the 20<sup>th</sup> century as management regimes became more restrictive in an effort to protect the stock from over exploitation there was a confounding surge in IUU fishing activity. There has been a steady and sustained improvement in recent years, as well as to the fishery-independent surveys, to the point at which ICES observes that "Unreported catches (IUU) and incomplete

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p>spatial coverage in surveys has been a problem in recent years, but do not affect the data collected in 2009-2010". In no small measure the reduction in IUU has been due to the Norwegian Directorate of Fisheries surveillance programme and its increasingly effective liaison network with receiving-port state control authorities who report landings back to NEAFC. There is also a growing antipathy to these practices across the industry as it realises that they tend to depress prices for all engaged in the fishery – both legal and illegal. Hence, there is a growing tendency for self-policing within, as well as information from, the industry to the enforcement agencies. While the impact of historical IUU catches on the stock and its assessment remains a source of uncertainty, it is one that is accounted for in the assessment and, by implication therefore, in the harvest control rule. ICES has also noted concern over potential discard levels in the trawl and longline fisheries, which may affect fishery removal statistics.</p>			
<p><b>Score: 85 (All UoCs)</b></p>			
<p>Haddock catches in Norwegian fisheries which do not directly target haddock keep full appropriate records but this does not necessarily extend to other nations. The principle shortfall relates to the problem of IUU in the haddock fisheries, although this issue appears to have been eliminated in very recent years, and potential discard levels in specific fisheries, as noted by ICES. Nevertheless, the fishery meets all SG80 requirements and one SG100, hence a score of 85.</p>			
<p><b>Audit Trace References</b></p>			
<p>ICES AFWG, 2010; ACOM, 2010a; Fiskeridirektoratet, 2008</p>			

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<b>1.2.4</b>	<b>Assessment of stock status:</b> There is an adequate assessment of the stock status	<p>The assessment estimates stock status relative to reference points.</p> <p>The major sources of uncertainty are identified.</p>	<p>The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.</p> <p>The assessment takes uncertainty into account.</p> <p>The stock assessment is subject to peer review.</p> <p>The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.</p> <p>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The assessment has been <u>internally and externally</u> peer reviewed.</p>

**Scoring Comments**

**The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.**

The assessment made of the NEA haddock stock is based on a considerable database built over the past half century or so. These data provide for an assessment that is appropriate in every respect making the fullest possible use of the abundant biological and environmental data that are relevant to both stock and fishery. SG100 met.

**The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.**

A number of uncertainties are recognised in the assessment, not the least of which is IUU fishing which has been significantly reduced by recent management actions, but ICES has also expressed concern for unknown levels of discarding in the long-line and trawl fisheries, spatial coverage of surveys, and changes to the harbour sampling programme. These uncertainties and their implications for the assessment and management advice are minimised by cross referencing the assessment to a variety of survey indices and by the application of alternative assessment models. Although uncertainties are investigated they have yet to be subject to a rigorous “probabilistic” analysis. Similarly, the investigation of alternative hypotheses and assessment approaches has been limited hitherto. SG80 met.

**The assessment has been internally and externally peer reviewed.**

The status and assessments of the stock are subject to rigorous annual review at a number of levels. The bipartite Norway–Russia meetings of fishery scientists carry out reviews independent of ICES even though many of these scientists are also members of the corresponding ICES working groups. Within ICES, the individual stock assessments are subject to internal peer review before advice is provided to member states and fishery commissions. ICES also commissions periodic reviews of specific stock

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p>assessments and its overall assessment methodology and assessments. One such review is about to commence. Less formally, assessments, assessment methods and management procedures and advice are subject to frequent scrutiny by a range of third parties from the fishing industry itself to a variety of environmental NGOs.</p>			
<p>Score: <b>90 (All UoCs)</b></p>			
<p>All SG80 and most SG100 requirements are met, hence a score of 95.</p>			
<p>Audit Trace References</p>			
<p>ICES AFWG, 2010; ACOM, 2010a; Anon., 2002; Anon., 2007;</p>			

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Principle 2</b>	<b>Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends</b>		
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<b>2.1</b>	<b>Retained non-target species</b>		
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<b>2.1.1</b>	<p><i>Status:</i> The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.</p>	<p>Main retained species are <u>likely</u> to be within biologically based limits or if outside the limits there are <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.</p>	<p>Main retained species are <u>highly likely</u> to be within biologically based limits, or if outside the limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> management measures in place such that the fishery does not hinder recovery and rebuilding.</p>	<p>There is a <u>high degree of certainty</u> that retained species are within biologically based limits.</p> <p>Target reference points are defined and retained species are at or fluctuating around their target reference points.</p>
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<b>Scoring Comments</b>
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**Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.**

The most important retained species commercially and by volume is North East Atlantic cod. This is the subject of a separate MSC assessment and is considered to be within biological limits with a high degree of certainty. The key stock of concern is coastal cod; currently recognised as a depleted species. ICES advice states that the distributional area of coastal cod is inside of the 12 nm limit of the Norwegian statistical areas 03, 04, 05, 00, 06, 07. The fisheries under assessment here are therefore expected to catch coastal cod.

The ICES AFWG (2011) working group provided preliminary estimates of biomass and fishing precautionary and MSY reference points for coastal cod.  $F_{crash}/F_{lim}$  was estimated at 0.32, based on the available stock-recruitment information and outputs of the recovery plan evaluation, while  $F_{msy}$  was considered in the range 0.16-0.32. These reference points were not included within the ICES ACOM report, and hence remain preliminary. Mean  $F_{4-7}$  for the period 2008-2010 from the XSA assessment was 0.36, although ICES ACOM note that "A trends-based assessment is provided for this stock" implying the XSA assessment and the resulting estimated stock status remains uncertain.

To cope with the situation, a group with representatives from the industry and the authorities has been working for over 5 years to develop an approach to limit fishing pressure on coastal cod. The regulatory approach has been detailed in the main text of this report, and in summary involves shifting the activity of larger vessel groups away from the coast and from particular areas in Lofoten (Henningsvær box) and in Borgundfjord. Regulations have been gradually strengthened and expanded, and continue to be

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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expanded. Regulatory measures to protect coastal cod now include a prohibition against the use of Danish seine inside the fjord lines to the north of 62 degrees north, vessels above 15 metres have to fish outside the fjord lines, fishing with pelagic nets is limited to certain periods, by-catch regulations, and limits on recreational fisheries.

To further recover the coastal cod stock, a new recovery plan for coastal cod was developed by the IMR and Norwegian Ministry, in collaboration with industry. This plan was evaluated by ICES through simulation. The plan notes that the overarching aim is to rebuild the stock complex to full reproductive capacity, as well as to give sufficient protection to local stock components. Until a biologically founded rebuilding target is defined, the stock complex will only be regarded as restored when the survey index of spawning stock in two successive years is observed to be above 60 000 tons (the average survey index in the years 1995-1998). The actual status of coastal cod in 1995-1998 relative to sustainable levels is not clear. Importantly, therefore, this rebuilding target will be redefined on the basis of relevant scientific information. Such information could, for instance, include a reliable stock assessment, as well as an estimate of the spawning stock corresponding to full reproductive capacity.

Based on simulations, ICES concluded that the plan, if fully implemented, was expected to lead to significant rebuilding. Nonetheless, accounting for realistic uncertainties in the catches, surveys, and the assessment model, a rather long rebuilding period was required even if fishing mortality is markedly reduced within the next several years. Whilst not fully quantifiable, the needed reductions in fishing mortality will require accompanying reductions in the catches.

ICES considers the proposed rule to be provisionally consistent with the Precautionary Approach.

Implemented as planned, therefore, the coastal cod recovery plan represents a measure in place that is expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. The effectiveness of these measures has been demonstrated through simulation.

The new Marine Resources Act, and associated regulations brought out in 2009 requires that “all catches of fish shall be landed”. Associated Regulations note that this does not include fish caught in contravention of provisions set out in or issued under the Marine Resources Act and capable of surviving, nor dead or dying fish of certain species. However, dead or dying fish or a wide range of species listed in Section 48 of the Regulations, which include the species which used to be considered bycatch species in the fishery, must be retained. Hence all main fish species caught within the fishery can be considered retained non-target species under the new Regulations. These species will therefore be landed and counted against the specific quotas. ICES advice indicates that the majority of the main retained species are within safe biological limits. However, there are a number of species of concern, being redfish (*Sebastes*), tusk and non-ETP elasmobranch species (due to their vulnerable life history).

*Sebastes* is the subject of ICES advice and ICES consider that the stock assessments and reference points for *Sebastes marinus* and *Sebastes mentella* are uncertain. As a result, the advice for these stocks for the fishery in 2011 is comparable to that advice given in recent years: There should be no directed trawl fishery on *Sebastes* in Subareas I and II. Area closures should be maintained and bycatch limits should be as low as possible until a significant increase in the spawning-stock biomass (and a subsequent increase in the number of juveniles) has been verified.

Dolgov et al (2002, 2005) examined the bycatch of skates in trawl and longline fisheries in the Barents Sea, i.e. offshore. However, this information is indicative of likely coastal impacts. Assessments of elasmobranchs is undertaken by WGEF (ICES Working Group on Elasmobranch Fisheries) but information is commonly insufficient to estimate stock status. WGEF has gathered landings (not discard) information for skates and rays in the region for the years 1973–2005. Information on bycatch in the trawl

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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fishery remains limited, but the University of Tromsø, Norway has initiated a study for a master degree with the title: “Elasmobranchs along the North-Norwegian coast-Diversity, distribution and density”. Impacts on sensitive benthic habitats (coral and sponge communities) are directly evaluated with some areas being closed to trawling as a response. Whilst most interactions are well estimated, by-catches of skates and rays (and possibly other non-commercial PET fish species) are not currently estimated. Dolgov et al. (2005) attempted to estimate the **total** skate catch during *international* trawl and long-line fishery for demersal fish in the Barents Sea and adjacent waters. The estimation was based on a method used at PINRO to determine catch of demersal fish taken as bycatch. The estimated catch of skates was shown to be much higher than the official landings, which indicated that a large proportion of the skate catch was not used for production but discarded back to the sea. Information from the ICES WG on Elasmobranch Fisheries does include details from the Barents Sea (largely based upon Russian data) and Norwegian Sea (although data are highly limited). Information is insufficient to provide reasonable stock estimates at this time, although projects are underway to address this. In the absence of stock assessments, concern remains due to the vulnerable nature of these species.

For these species and species groups, a range of management measures is in place. For redfish and elasmobranchs (specifically skates), the new Regulation to retain all caught individuals of these species will provide better future information on the levels of catches and status of these species. They will also allow the implementation of further measures if information indicates this is necessary. However, it must be ensured that this information is examined for the fleet and where necessary mitigation plans put in place. Further regulations for redfish include the potential closure of fishing to limit catches of fish under the minimum size (below 32cm in length).

There are gear-specific additional management restrictions:

**Longline**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines. Long-liners fishing with automatic baiting also have to fish outside 4 nautical miles.

Redfish catch levels (species combined) within the Barents Sea by longliners were approximately 2 tonnes in 2008. This minimal bycatch represents an operational management measure to limit the impact on this species.

The potential impact of longlines on endangered elasmobranch populations are unlikely to create unacceptable impacts to ETP species based upon the catch information available. The proportion of the total skate catch fished in the long-line fishery (1996-2001) was low, around 0.3% of landings (but smaller skate would be discarded), while other Russian studies indicate low rates relative to cod and haddock catches (0.03%) . This appears consistent with observations on the fishery itself. National regulations now require all skate species (the group of concern) to be retained, and hence a time series of information can be developed over the coming years.

Unobserved mortality is anticipated to be low, based on both expert experience and research. For example, research in other hook and line fisheries suggests levels of unobserved mortality are likely to be low (e.g. <1%) or none.

**Trawl**

Relevant to coastal cod, trawlers generally have to fish outside 12 nm, although this is 6 nm or less in some geographic areas.

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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While historically there was a directed fishery for redfish, this has now been banned. Regulations now stipulate a 15% bycatch limit by weight in each catch for trawls. In 2008, catch levels amounted to ~5500t. There are exclusion areas from the continental slope of Lofoten to the south, and strip from 62°N, to protect *Sebastes* spawning activity.

The potential impact of trawling on endangered elasmobranch populations are unlikely to create unacceptable impacts to ETP species based upon the catch information available. The proportion of the total skate catch fished in the long-line fishery (1996-2001) was low, around 0.3% of landings (but smaller skate would be discarded), while other Russian studies indicate rates relative to cod and haddock catches of (0.03%) . This appears consistent with observations on the fishery itself. National regulations now require all skate species (the group of concern) to be retained, and hence a time series of information can be developed over the coming years.

Experiments on the degree of unobserved mortality within Norwegian trawl fisheries have been performed and estimates of mortality can be derived. Evidence suggests that haddock escape mortality is higher than cod, and inversely related to fish length, but not related to any selection device used or fishing intensity (e.g. codend meshes and sorting grid) not related directly to passing through the mesh. This subject has been a study of a PhD student at Bergen University.

**Danish seine**

Relevant to coastal cod, vessels fishing with Danish seine have to fish outside the fjord lines.

For Danish seines, estimates were made that less than 1% of the catch is comprised of redfish. Two periods of redfish prohibition for the coastal fleet, where between 1<sup>st</sup> March and 30<sup>th</sup> June, a 15% bycatch limit operates, and between 1<sup>st</sup> Sept and 30<sup>th</sup> Sept, no directed fishing allowed. Regulations now stipulate a 20% bycatch limit for conventional gears, calculated as live weight per week, or in each catch dependent upon the fishing approach.

The potential impact of towed gear on endangered elasmobranch populations are unlikely to create unacceptable impacts to ETP species based upon the catch information available. National regulations now require all skate species (the group of concern) to be retained, and hence a time series of information can be developed over the coming years.

Experiments on unobserved mortality have not been performed for Danish seines. However, those performed for trawls suggest that mortality from nets is likely to be minimal.

**Gillnets**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines.

The shallow nature of fishing means redfish are seldom caught by gillnets. Two periods of redfish prohibition for the coastal fleet, where between 1<sup>st</sup> March and 30<sup>th</sup> June, a 15% bycatch limit operates, and between 1<sup>st</sup> Sept and 30<sup>th</sup> Sept, no directed fishing allowed.

The potential impact of gillnets on endangered elasmobranch populations are unlikely to create unacceptable impacts to ETP species based upon the catch information

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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available. National regulations now require all skate species (the group of concern) to be retained, and hence a time series of information can be developed over the coming years.

Experiments of unobserved mortality have not been performed for gill nets. However, those performed for trawls (which are expected to result in a greater unobserved mortality) suggest that mortality from nets is likely to be minimal.

**Hook and line**

Relevant to coastal cod, since 2004 only vessels less than 15 meters have been allowed to fish within the fjords, as defined by fjord-lines. Moreover, only vessels less than 21 meters have been allowed to fish between the base lines and the fjord lines.

No information from the reference fleet is available on hook and line catches. The species-specific nature of hook and line fishing essentially eliminates catches of redfish. Regulations now stipulate a 20% bycatch limit for conventional gears, calculated as live weight per week, or in each catch dependent upon the fishing approach.

Experiments on unobserved mortality have not been performed for hook and line gear. However, experience suggests that mortality is likely to be minimal – fish would either be landed or would escape hooks.

**If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.**

The status of stocks of the main retained species is known through analytical stock assessments which allow the evaluation of stock status relative to a variety of reference points. This SG element is therefore not scored.

**Score: 70 (All UoCs)**

For coastal cod and redfish there are strategies or partial strategies in place to ensure the fishery does not hinder recovery and rebuilding of any populations outside of biological limits. For elasmobranchs there are measures in place. In the case of coastal cod in particular, specific recovery plans are being implemented which are expected (through simulation) to be effective, but currently insufficient time has elapsed for practical evidence that these measures are effective to be gained. As there is only one scoring element between 60 and 80, a partial score of 70 is awarded.

**Condition 1 has been generated for this P.I**

**Audit trace references**

Ingólfsson et al.; Ingólfsson (2006); Furness (2003); ICES (2010b); ACOM (2010b); ACOM (2010c), ACOM (2011d), ACOM (2011e); ACOM (2011c); ICES AFWG (2011b)  
<http://www.ices.dk/reports/ACOM/2008/AFWG/Sec-02%20Cod%20in%20subareas%20I%20and%20II.pdf>  
<http://www.regjeringen.no/nb/dep/fkd/pressesenter/pressemeldinger/2008/vernetiltak-for-norsk-kysttorsk-i-2009.html?id=541147>  
<http://www.regjeringen.no/nb/dep/fkd/pressesenter/pressemeldinger/2010/endra-vernetiltak-for-kysttorsk-i-2010.html?id=613460>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.1.2</b></p>	<p><b>Management strategy:</b> There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.</p>	<p>There are <u>measures</u> in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>partial strategy</u> in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>There is some <u>objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being <u>implemented successfully</u>.</p>

Scoring Comments
<p><b>There is a strategy in place for managing retained species.</b> Control over the coastal Northeast Arctic haddock comes through the Norwegian fisheries Ministry. Objectives for sustainable precautionary management are in place through the Norwegian management controls on fishing and are detailed under Principle 1, along with associated controls and reference point levels and agreed harvest control rules, and in the case of coastal cod, an agreed and evaluated recovery plan.</p> <p>Strategies for the retained species are comparable to those for the target species. These include the closure of areas/move-on rules where undersized/juvenile fish are caught, being monitored by the Coastguard at sea; minimum size limits for many species (although when fishing for cod, haddock and saithe using trawls and conventional gear north of 62°N, an intermixture of up to 15% by number of cod, haddock and saithe under the minimum size is permitted in each catch); overall gear controls through (for example) mesh size limits; gear-specific closed areas and seasons (related to vulnerable marine ecosystems and redfish, and including general exclusion of trawlers, longliners and Danish seines from fishing within the fjords); requirements for trawls to use sorting grids (the effectiveness of which has been tested); bycatch limits for particular species; and the requirement to retain all individuals of listed species.</p> <p>At present, given that information collection has just begun through the new regulations, measures for non-TAC species are more limited.</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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The use of logbooks (>13m) and simpler reporting methods (<13m) which provide spatially discrete information, is an integral part of the management plan.

The recent development of the coastal cod recovery plan has been detailed under 2.1.1. This recovery strategy was developed collectively by scientists, industry and managers.

A strategy is therefore in place for some species, and a partial strategy only for other species (e.g. coastal cod, elasmobranchs), hence a score of 80.

**The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.**

The strategy has been specifically designed for the Norwegian fishery, based upon the species, ecosystems (e.g. fjords) and enforcement capabilities (e.g. at sea work of the Coastguard). It has been tested for a number of years through the successful management of NEA cod, haddock, saithe etc. and hence there is a high degree of confidence that the strategy will work. However, for those species for which full data were not collected prior to the new Regulations, the time series does not allow this to be confirmed, but experience strongly suggests a strategy that will work, hence a score of 100.

The evaluation of the performance of the recently developed coastal cod recovery plan has been detailed under 2.1.1 and scored specifically under that PI. However, it is noted that based on simulations, ICES concluded that the plan, if fully implemented, is expected to lead to significant rebuilding. Nonetheless, accounting for realistic uncertainties in the catches, surveys, and the assessment model, a rather long rebuilding period was required even if fishing mortality is markedly reduced within the next several years. This is not an obstacle to certification.

**There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.**

Evidence from the Coastguard, through logbook returns, as well as the reference fleet, provides clear evidence that the strategy is being implemented successfully, and management is being successful, for the key species. However, for those species for which full data were not collected prior to the new Regulations, the time series does not allow this to be confirmed, and so this score remains at 80.

**There is some evidence that the strategy is achieving its overall objective.**

The successful management of species such as haddock, saithe, etc. provides some evidence that the strategies being undertaken are achieving their overall objective. In turn, existing measures for coastal cod have halted declines in the stock, and the recovery plan has been scientifically evaluated and is expected to lead to significant rebuilding. However, as noted above, for those species for which data are only recently collected and for coastal cod since the recovery plan has only recently been put into action, this evidence is lacking at present, so a score of 80.

<b>Score: 85 (All UoCs)</b>
All SG80 requirements are met and a few of SG100, hence a score of 85.
<b>Audit trace references</b>
ICES (2010b); ACOM(2010d), ACOM(2010e), Interview with IMR, Interview with Fiskeridirektoratet

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.1.3</b></p>	<p><b>Information / monitoring:</b> Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.</p>	<p><u>Qualitative information</u> is available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>adequate</u> to <u>qualitatively</u> assess outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures</u> to manage <u>main</u> retained species.</p>	<p><u>Qualitative information</u> and some quantitative information are available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>sufficient</u> to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage <u>main</u> retained species.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p> <p>Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage retained species, and evaluate with a <u>high degree of certainty</u> whether the strategy is achieving its objective.</p> <p>Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.</p>

Scoring Comments
<p><b>Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.</b></p> <p>From the commercial fleet, the new Marine Resources Act and associated Regulations requires a large list of fish species, including all skates (the key elasmobranch) to be retained and landed (or enumerated). This means that data collection for retained species is comparable to that of the target species. For those species for which data collection has only just begun, the consequences for the status of affected populations is not yet achievable.</p> <p>Sampling of retained species of interest also occurs through institute contracts with the industry collecting samples, through the coastal reference fleet, through Coastguard collected length frequency distributions (although these are not used within assessments as they are likely biased), as well as occasional IMR observers on specific vessels for scientific sampling of generally special cruises (e.g. gear development trials, new species trials), and through specific scientific research cruises and surveys (for population level status). Further information on size of landed individuals will be available through the sales organisations, but sex composition information is not collected.</p> <p>For coastal cod, the time series from The Norwegian coastal survey provides estimates of relative biomass, which combined with the information from landings provides accurate and verifiable information. In turn, since 2005, a reference fleet of coastal vessels, mainly gillnetters, provide regular sampling data for length, age, and stock separation. These data are used to estimate catch-at-age for the corresponding fleets. In addition, when fishing between the 4- and 6-mile lines the freshfish trawlers provide otoliths for stock separation. Reliance on survey estimates of biomass within the recovery plan becomes more pertinent since it is noted that in mid-2009 the Institute of</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Marine Research closed down an important part of the coastal landings sampling programme. This was meant to be compensated by increased sampling by the “reference fleet”. This was not fully achieved. The ICES AFWG (2011) note that estimated catches of coastal cod are thus even more uncertain than in previous years.

Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery, and hence a score of 80 is given for this issue.

**Information is sufficient to estimate outcome status with respect to biologically based limits.**

The information collected is designed to form the basis of scientific stock assessments. As such, it is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty. It must be noted that for those species for which data collection has only just begun, the time series will need to be extended before full analytical stock assessments can be made. Furthermore, the general level of catches may not be sufficient to perform stock assessments, but will provide sufficient evidence to base stock status estimates upon which precautionary management decisions can be based. As noted above, information available are sufficient to support simulations on future projections of coastal cod status under the coastal cod recovery plan, although uncertainties remain.

Experimental studies of unobserved mortality allow quantitative estimates to be directly estimated or inferred. This issue scores 80.

**Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.**

For those species where the time series is sufficient, the information is capable of supporting the stock assessment and management plans derived for the key species. As noted, for those species where data collection has just begun, these data should prove adequate when a sufficient time series has been collected. In turn, the coastal survey provides sufficient information on which to base the coastal cod recovery plan. This issue therefore scores 100.

**Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.**

The requirement to retain all individuals of the majority of species from 2009 means that monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. However, it is noted that formal stock assessments of coastal cod have been uncertain due to the shortage of information from the recreational and tourist fisheries respectively. This is the reason to currently focus on the fishery independent coastal survey. This issue scores 80.

<b>Score: 85 (All UoCs)</b>
All of the SG80 requirements are met and one of the SG100, hence a score of 85. This PI would score higher when a sufficient time series has been collected.
<b>Audit trace references</b>
Ingólfsson et al.; Ingólfsson (2006); Furness (2003); ICES (2011b)

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.2	Discarded species (also known as “bycatch” or “discards”)		
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2.2.1	<p><b>Status</b> The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.</p>	<p>Main bycatch species are <u>likely</u> to be within biologically based limits, or if outside such limits there are mitigation <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding.</p> <p>If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.</p>	<p>Main bycatch species are <u>highly likely</u> to be within biologically based limits or if outside such limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> mitigation measures in place such that the fishery does not hinder recovery and rebuilding.</p>	<p>There is a <u>high degree of certainty</u> that bycatch species are within biologically based limits.</p>
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**Scoring Comments**

**There is a high degree of certainty that bycatch species are within biologically based limits**  
 Bycatch species are defined as those species not retained and are discarded. Using MSC guidelines describing main bycatch species, under this definition and as a result of the new regulations, there is officially no discarding within the fishery. Bycatch of non-commercial (non regulation 48) species in this fishery is trivial and these species are fully expected to be within biologically based limits. This is confirmed as far as possible by Norwegian Coastguard, the reference fleet, and occasional observer records, although these can only cover a proportion of the fleet.

**Score: 100 (All UoCs)**

SG80 and SG100 requirements are met.

**Audit trace references**

Marine Resources Act  
 Interview with Norwegian enforcement  
 Interview with IMR and Fiskeridirektoratet

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.2.2</b></p>	<p><b>Management strategy:</b> There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations.</p>	<p>There are <u>measures</u> in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>There is <u>some objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p>
			<p>There is a <u>strategy</u> in place for managing and minimising bycatch.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p>

Scoring Comments
<p><b>There is a strategy in place for managing and minimising bycatch.</b> The new Marine Resources Act, and associated regulation 48 and related measures represent a strategy in place for managing and eliminating discards of commercial and main bycatch species. This is supported by the Coastguard enforcement programme, along with gear restrictions which minimise the catch of unwanted sizes and species (e.g. mesh size limits, sorting grids). Score 100.</p> <p><b>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.</b> The overarching strategy defined by the Marine Resources Act and the gear-specific regulations are based directly on the Norwegian fishery and ecosystem, and the design of the Norwegian enforcement system, which concentrates on enforcement at sea. Given the enforcement at sea, and information from the Coastguard, there is a high confidence that the strategy will work. Score 100.</p> <p><b>There is some evidence that the partial strategy is being implemented successfully.</b> Data from the fishery, reference fleet and Coastguard provides evidence that the strategy of retaining all main species is being implemented successfully. This will overtime provide better information to judge the impact of fisheries on target and non-target stocks, and hence whether the strategy is achieving its objective.</p> <p>Bycatch of non-commercial (non regulation 48) species in this fishery is trivial and these species are expected to be within biologically based limits. Score 80.</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Score: 95 (All UoCs)</b>
All SG80 requirements are met and most SG100, the score will improve further with further evidence that the strategy is achieving its objectives.
<b>Audit trace references</b>
Marine Resources Act Interview with Norwegian enforcement Interview with IMR and Fiskeridirektoratet

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.2.3</b></p>	<p><b><i>Information / monitoring</i></b>  Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.</p>	<p><u>Qualitative information</u> is available on the amount of main bycatch species affected by the fishery.</p> <p>Information is <u>adequate</u> to <u>broadly understand</u> outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures</u> to manage bycatch.</p>	<p><u>Qualitative information and some quantitative information</u> are available on the amount of main bycatch species affected by the fishery.</p> <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage main bycatch species.</p> <p>Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p> <p><u>Accurate and verifiable information</u> is available on the amount of all bycatch and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient</u> to quantitatively estimate outcome status with respect to biologically based limits with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective.</p> <p>Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.</p>

Scoring Comments
<p><b>Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery.</b>  The Marine Resources Act and associated regulations now provides quantitative information on all retained species. Further information is available through Coastguard records. However, information on discarding is not currently available from the reference fleet although this is fully expected to be trivial. <b>Score 80.</b></p> <p><b>Information is sufficient to estimate outcome status with respect to biologically based limits.</b>  The information available from research surveys provides information sufficient to estimate outcome status for bycatch species. The incomplete nature of the fish bycatch gathered from the reference fleets means that it cannot support survey based observations. <b>Score 80.</b></p> <p><b>Information is adequate to support a partial strategy to manage main bycatch species.</b>  The information from Coastguard enforcement is adequate to support the strategy. However, the Coastguard cannot cover all vessels and hence it cannot be considered a comprehensive strategy. The information available meets the requirements to support the partial strategy and provides the basis for building a comprehensive strategy underpinning the Barents Sea Management Plan and Marine Resources Act and associated regulations. The incomplete nature of the fish bycatch gathered from the reference</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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fleets means that as yet the information is inadequate to monitor the success of strategies relative to their objectives. **Score 80.**

**Sufficient data continue to be collected to detect any increase in risk to main bycatch species**  
Annual research surveys within the Norwegian and Barents Seas provide sufficient and standardised data to detect any increase in the risk. Information collected through programmes such as MAREANO is sufficiently frequent and comprehensive enough to assess ongoing mortalities to all bycatch species.. **Score 80.**

<b>Score: 80 (All UoCs)</b>
All SG80 requirements are met, but no SG100.
<b>Audit trace references</b>
Client meeting; Ingólfsson et al.; Furness (2003); Ingólfsson, (2006); Nedreaas et al (2008)

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>2.3</b>	<b>Endangered, Threatened and Protected (ETP) species</b>
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<b>2.3.1</b>	<p><i>Status:</i> The fishery meets national and international requirements for protection of ETP species.</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.</p>	<p>Known effects of the fishery are <u>likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Known direct effects are <u>unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p>	<p>The effects of the fishery are known and are <u>highly likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Direct effects are <u>highly unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p>	<p>There is a <u>high degree of certainty</u> that the effects of the fishery are within limits of national and international requirements for protection of ETP species.</p> <p>There is a <u>high degree of confidence</u> that there are <u>no significant detrimental effects (direct and indirect)</u> of the fishery on ETP species.</p>
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<b>Scoring Comments</b>
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ETP species can be based upon those in a range of sources. That used to provide an indication for this scoring is the Norwegian Red List, as used within the Barents Sea Management Plan to define such species (this therefore being a component of Norwegian Legislation). This is used together with other National legislation and International Conventions.

**The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.**

Reviewing all the data noted within 2.3, of the various categories of ETP that might be impacted by the fisheries as a whole, these fall within the categories of birds, marine mammals, and fish. Other members of these groups are considered here as iconic species; for example, the Barents Sea Management Plan notes the importance of the life history and population trends of bird species within the ecosystem of the Barents Sea. The potential impact of gears on non-target fish is identified through the inclusion of skates and other species within the Marine Resources Act and accompanying Regulations, although a time series of information on the level of these catches has not yet been established and this prevents a high degree of certainty being obtained. This is dealt with under PI 2.2.

**Score 80**

**Direct effects are highly unlikely to create unacceptable impacts to ETP species.**

This issue is scored by gear:

***Trawl***

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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**Score: 60**

Information on seabird interactions is being developed but is not yet available. Experience in other trawl fisheries suggests mortalities can occur but have not been enumerated within this fishery.

Pelagic fisheries elsewhere e.g. winter bass fishery in the Western English Channel are known to take small cetaceans, possibly in significant numbers. The introduction of pelagic trawls to this fishery therefore raises the risk that small cetaceans may be taken, although their use in inshore waters is limited. The problem identified in the Western English Channel however, appears to be highly localised and from the experience in mackerel and herring fisheries in ICES sub areas II and IV suggests that it is unlikely to prove a significant problem, if any problem at all, in this fishery.

There is no consistent time series of information to assess the likely impact on ETP fish species, although information will now be collected as a result of the Act.

***Longline***

**Score: 60**

Interactions with ETP sea mammals are thought to be extremely minor. Hooks are too small to lead to marine mammal bycatch, and no evidence of issues is available for the Norwegian longline fleet, IMR or enforcement officers.

Seabirds scavenge baits from the hooks of commercial longlines, resulting in incidental seabird mortality and bait loss. Seabird interactions have also been recorded through the commissioned vessel scheme and has been considered under the BSMP. Seabird interactions have been investigated by the Institute of Nature Research (NINA) as to the significance of such interactions on seabird populations. Some self-monitoring of seabird bycatch has occurred in parts of the Norwegian longline fleet and research performed by IMR. The client notes that all vessels voluntarily use the bird scaring line (“kjalkeskrema”) which virtually eliminates bird bycatch (see 2.2). However, figures directly from this component of the fleet were not available, and formal and detailed collection of information by the fleet is lacking.

There is no consistent time series of information to assess the likely impact on ETP fish species, although information will now be collected as a result of the Act.

***Gill Net***

**Score: 60**

Numbers and catch rates of seals (predominantly harp seals) caught in nets of different mesh sizes are available. However, rates of interaction were dependent upon mesh sizes and are affected by ecosystem considerations (e.g. the availability of capelin) and the location of the nets relative to the shore. The species interacting with gears within the fishery is unclear, but likely to be harp seals. Harp seals are subject to population assessments by a joint ICES/NAFO working group (WGHARP). The 2009 assessment was uncertain, with new surveys indicating reduced pup production, with notable declines suggested from 2003 levels. As a result the assessment model was rejected and an alternative approach used to estimate TACs for seal hunting at 30,062 animals. The level of mortality resulting from gears is felt unlikely to be equivalent to direct mortality through culling. However, further information is needed from the fishery to confirm this.

Harbour porpoise, while listed within the Red List as a species of least concern, are specifically mentioned within the BSMP and is a species for which Norway has accepted responsibility to maintain the population status (e.g. species which are globally threatened or over 25% of the total European population resides within Norwegian waters). From the data available, it appears that catches of harbour porpoises are greatest in large mesh size gillnets of a type not used in the cod fishery. Observation of mesh size restrictions within the cod gill net fishery will therefore limit any impact. The impact of the gillnet fishery on the population, whilst not explicitly assessed, is therefore likely to be less than the impact of other fisheries. Population sizes have been estimated (SCANS, SCANS-II projects, BSMP) suggesting that total population size in Norwegian waters is 37,000 (SCANS) plus 11,000 in the Barents Sea (PINRO/IMR 2006; BSMP Management Plan Fisheries Report). ASCOBANS report that additional fishery induced mortality of 1.7% of the population estimate may be sustained by harbour porpoise populations, which would equate to approximately 800 animals annually. However, although some estimates of harbour porpoise by-catch in gill nets of the type used in the fishery have been made, the data do not appear to have been analysed so as to allow an assessment to be made on the relative impact of the specific fishery. Impacts from gillnets in Norwegian waters are considered moderate to high (BSMP Supporting Document, “Utredning av konsekvenser av fiskeri i områadet Lofoten – Barentshavet”, Fiskeridirektoratet, June 2004). The results of Condition 2 will identify whether management is required for gillnets in this fishery.

There is no information to assess the likely impact on ETP fish species, although information will now be collected as a result of the Act.

#### *Danish seine*

**Score:60**

There is a notional risk of birds being ensnared in the latter stages of hauling but such events are likely to be extremely rare but have not been enumerated within this fishery. Interactions with marine mammals have not been identified but are expected to be negligible due to the method of fishing. However, information is not available from the fishery to confirm this.

There is no information to assess the likely impact on ETP fish species, although information will now be collected as a result of the Act.

#### *Hook and line*

**Score: 100**

Given the reasonably species-specific nature of the fishery, this gear is not expected to pose an unacceptable risk to ETP species, and no other issues with ETP species are reasonably expected to occur. There is therefore a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species from this gear.

**Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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ECOSIM modelling of indirect effects has been performed for key species, and this suggests that there are no major trophic consequences (notably on cetaceans) of changing harvest rates of cod within the boundaries of established sustainable limits. **Score 80**

<b>Score</b>
Trawl <b>75</b> Long line <b>75</b> Gill Net <b>75</b> Danish Seine <b>75</b> Hook and Line <b>85</b>
<b>Condition 2 has been generated for this P.I.</b>
<b>Audit trace references</b>
Norwegian Ministry of the Environment (2005); Furness (2003); Dolgov et al. (2002); interview with Norwegian Ministry of Fisheries; ICES WGHARP (2009)

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.3.2</b></p>	<p><b>Management strategy</b> The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;</li> <li>- ensure the fishery does not hinder recovery of ETP species; and</li> <li>- minimise mortality of ETP species.</li> </ul>	<p>There are <u>measures</u> in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>The measures are <u>considered likely</u> to work, based on <u>plausible argument</u> (eg general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>There is an <u>objective basis for confidence</u> that the strategy will work, based on <u>some information</u> directly about the fishery and/or the species involved.</p> <p>There is <u>evidence</u> that the strategy is being implemented successfully.</p> <p>There is a <u>comprehensive strategy</u> in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, that is designed to achieve <u>above</u> national and international requirements for the protection of ETP species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and a <u>quantitative analysis</u> supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.</p>

**Scoring Comments**

**There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, that is designed to achieve above national and international requirements for the protection of ETP species.**

Norway has ratified a number of conventions on species protection and management, including the Convention on Biological Diversity, Bern, Bonn and CITES Conventions, these establish overarching objectives for ETP species conservation. Furthermore, NAMMCO (the North Atlantic Marine Mammal Commission), along with IWC and ICES, have recommended that member countries, including Norway, should monitor and report by-catches of marine mammals and seabirds. The Norwegian Red List, as used within the Barents Sea management plan to define endangered and vulnerable species, is updated regularly. If issues relating to protected, endangered or threatened species are identified, various mechanisms have been developed to detect and reduce their impact. This includes i) Biodiversity Action Plans that provides action plans for the protection of key and threatened species and habitats; (ii) the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area that has identified a number of key species and habitats are considered as ‘threatened or declining’. In turn, an overarching review of ecosystem impacts takes place through the BSMP, which also identifies appropriate mitigation measures as necessary.

The BSMP notes the importance of the life history and population trends of bird species within the ecosystem of the Barents Sea, and noted that “In the light of new knowledge, the Government will assess the need for restrictions on gear to reduce bycatches of vulnerable seabirds in certain areas and during certain periods. The Government will also take steps to reduce bycatches of seabirds through the development and adaptation of suitable gear”. The SEAPOP (Seabird Population Management and Petroleum Operations) programme has been developed to examine this further. Oil and gas activities have been forbidden in key areas of the Barents Sea, as a result of the

ecosystem management plan, and some marine protected areas have been established. Furthermore, the activities of IMR and the fishery organisations have identified key areas of vulnerable habitat in relation to fishing activities.

In general, where there is an identified requirement for strategies to be enacted, appropriate actions appear to be in place, including monitoring of potential interactions with ETP species; the new Marine Resources Act and associated Regulations provide a strategy for managing fishery impacts on ETP species.

Regulations for fish species have increased in their effectiveness on the basis of the new Marine Resources Act and regulations, due to the requirement to land all individuals caught of a wide range of species, including skates which are of some concern in the fishery. It should be noted that although not currently the case, there is provision within the Act for the Ministry to lay down a duty to land bycatches of other marine organisms, including plants, marine mammals and seabirds, or a duty to provide reports on such bycatches. This provision has not yet been exercised, but demonstrates the ability to expand the system.

### **Longline**

Precautionary preventative measures to minimise seabird mortality, notably the use of the bird scaring line (“kjalkeskrema”) which has been investigated by IMR and shown to reduce bird bycatch significantly, and be far more effective than alternative methods. The use of this line is not mandatory, but vessels apparently use this device voluntarily, as it reduces the high levels of bait loss and relieves the reduced catching efficiency of longlines that results from fishing activity. Additional methods to reduce bird bycatch have been examined (e.g. the use of special Mustad self-weighted lines that increase their rate of sinking, use of tubes on deployment) and offal is generally discarded on the opposite side of the vessel to that on which the longline is deployed. These measures are not mandatory and appear to be used variously within the fleet.

### **All gears score 100**

**There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved.**

The strategies have been developed to suit the Norwegian fishing and enforcement framework. They are specifically based upon information available on ETP species, and allow adaptation in the face of new information. The strategies are gear specific, ensuring that the key impacts are reduced. Ongoing monitoring is in place for some ETP components (see 2.3.3) to allow quantitative analysis to occur. In particular cases data are currently insufficient to support a high confidence of the strategy’s effectiveness (see 2.3.1). **Score 80**

**There is evidence that the strategy is being implemented successfully.**

The strategy for safe-guarding ETP species is embodied within the existing Barents Sea management plan and the Norwegian Sea management plan (which is being developed from it) and the Marine Resources Act. The Coastguard and Direktoratet monitor the activities of the fishing industry at sea to ensure compliance with the relevant fishery regulations. **Score 80**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Score:85 (All UoCs)</b>
All of the SG80 requirements are met and one of the SG100.
<b>Audit trace references</b>
Norwegian Ministry of the Environment (2005) Dolan et al., 2009

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>2.3.3</b></p>	<p><b>Information / monitoring</b>  Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species.</li> </ul>	<p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species.</p> <p>Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p>	<p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p> <p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>

Scoring Comments
<p>Information available from the 2010 Norwegian red list, which is used in National legislation (e.g. the Barents Sea management plan) to define endangered and vulnerable species, indicates a number of marine species which are considered ETP, or data deficient. These include teleosts and elasmobranchs (now required to be retained under the Act and considered under 2.1), marine mammals, and birds. The BSMP also specifically lists Barents Sea species, which includes bowhead whale, lesser black-backed gull, guillemot and puffins as endangered or vulnerable according to IUCN criteria, although this list may have changed in the intervening years.</p> <p><b>Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts.</b></p> <p>Numerous Norwegian research and ecosystem cruises have been performed in this area, examining benthos, fish, bird and mammal distributions and abundance. In turn, the area is the focus of a large amount of research by IMR on habitats, oceanography, biological distributions, and trophic interactions. Population levels of and fishery interactions with other ETP species such as birds and marine mammals have been studied through a range of approaches, while the Institute of Nature Research (NINA) have investigated the interactions between seabirds and fisheries. The ability of the data to quantitatively estimate outcome status with a high degree of certainty varies with the ETP species.</p> <p><b>Sea mammals.</b></p> <p>NAMMCO (the North Atlantic Marine Mammal Commission), along with IWC and ICES, have recommended that member countries, including Norway, should monitor and report by-catches of marine mammals and seabirds. IMR have a programme examining the ecology and ecosystem dynamics of <i>Lagenorhynchus</i> dolphins, following this</p>

recommendation. The programme is investigating the exposure of mammalian top predators to environmental contaminants and is studying effects on their health status. For the coastal and inshore fisheries, vessel owners have provided information on effort, catch and by-catch over the period October-December 2005, in return for financial compensation. These concentrated on gillnet and trap fisheries. Further information on some by-catches is also collected by the 'reference fleet' operating in Norwegian waters, which includes most of the gears under consideration within this certification. In turn, seals are also surveyed intermittently along the Norwegian coast and in the Barents Sea, as examined during the ICES WGHARP working groups, but there are no regular systematic surveys of abundance.

### Seabirds

The BSMP notes the importance of the life history and population trends of bird species within the ecosystem of the Barents Sea. The SEAPOP (Seabird Population Management and Petroleum Operations) programme has been developed to examine this further. This programme aims to improve knowledge of seabirds through studies of distribution and population size, in order to help distinguish between natural variations and anthropogenic impacts. A joint Norwegian-Russian database of bird colonies in the Barents Sea also exists ([http://www.barentswatch.com/bw/bw\\_06/bw\\_06\\_en.pdf](http://www.barentswatch.com/bw/bw_06/bw_06_en.pdf)). Links between bird numbers and prey levels have been developed (e.g. guillemots, puffins, spring-spawning herring, capelin).

Information on bird bycatch within fisheries is incomplete, however. Scattered information about bycatches of various species is available, for example, from longline fisheries and some gill-net fisheries. At certain times, and in certain areas, there can be relatively large bycatches of diving seabirds in gill nets, although whether this is within the gill net fishery under certification is unclear. The SEAPOP (Seabird Population Management and Petroleum Operations) programme has been developed to examine this further, while NINA have been studying fishery/bird interactions.

**All gears score 80.**

### **Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.**

Information by gear is available to allow fishery-related mortality and the impact of fishing to be quantitatively estimated for ETP species. While time series is limited for some species, the Act and associated regulations promote better catch data collection over time. Through the work underpinning the BSMP, key geographical areas have been identified that are important for biodiversity and biological production in the area, and where adverse impacts might persist for many years. Besides being important within the life history stages of key commercial fish species (e.g. spawning and nursery areas), several of the areas were also identified as important as breeding, moulting or wintering areas for seabird populations of international importance, such as the lesser black-backed gull (subspecies *Larus fuscus fuscus*), Steller's eider and Atlantic puffin.

### Longlines

Interactions of longlines with sea mammals are thought to be extremely minor. Hooks are too small to lead to marine mammal bycatch, and no evidence of issues is available for the Norwegian longline fleet. While mammal-longline interactions are noted in the Southern Atlantic (e.g. killer whales preying on longline catches, sperm whales being entangled in longlines), no similar issues have been noted by the industry, IMR or enforcement officers.

Some self-monitoring of seabird bycatch has occurred in parts of the Norwegian longline fleet, primarily offshore, with less than 1 bird per day estimated to be caught (this being a winter, and hence night-time fishery). Other studies have suggested that North Atlantic cod fisheries using longlines may result in bird bycatches at rates of up to 1.75

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birds per 1000 hooks, although rates may be less if lines are set at night. IMR has also performed research on the rate of bird bycatch in longlines fisheries and examined approaches to reduce these rates. Seabirds scavenge baits from the hooks of commercial longlines, resulting in incidental seabird mortality and bait loss. The great majority of the birds caught were northern fulmars (*Fulmarus glacialis*, considered near threatened in the 2010 red list). Studies showed that with a total of 185 000 hooks set, 205 birds were caught (1 every 900 hooks). A longliner sets ~ 30,000 hooks per day, suggesting on average a catch of ~ 33 birds on lines without mitigation measures. With the use of mitigation measures (use of a bird scaring line, or “kjalkeskrema”), which all vessels within the fleet are indicated to use voluntarily to reduce bait loss due to birds, bycatch was reduced to 2 birds for this number of hooks, while in other experiments no birds were caught on 58,420 hooks when a bird scaring line was used. Seabird interactions have also been recorded through the commissioned vessel scheme and has been considered under the BSMP. Seabird interactions have been investigated by the Institute of Nature Research (NINA) as to the significance of such interactions on seabird populations. Presently, according to the Barents Sea management plan, bycatch levels “did not constitute a threat to the population” but are nonetheless at a significant level. However, figures directly from this component of the fleet were not available, and formal and detailed collection of information by the fleet is lacking.

**Trawl**

Interactions of trawl gear with sea mammals are expected to be limited, but will vary between demersal and pelagic trawls. Given the introduction of limited pelagic trawls in the NEA haddock fishery, this should be monitored. Norway observers spent 3700 hrs on demersal trawls (target spp. unspecified), primarily offshore, and no marine mammal interactions reported. Contracted commercial vessels have also made direct observations and no marine mammal interactions were reported. Evidence therefore supports an estimation that the occasional interaction can occur, but rarely.

Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in the BSMP of indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and trawls do not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered. Interactions with birds are rare, with owners observing that birds may very occasionally be seen striking trawl warps, but have never been caught in net. This is supported by observations from trawlers within the reference fleet.

**Gill Net**

Studies have shown that gill nets set inshore with varying mesh sizes may interact with sea mammal populations, with key interactions noted with harp, common and harbour seals. Gillnets operating inshore with 180mm mesh (slightly larger than the mesh size specified by regulations in the cod fishery, being >156mm when fishing for cod north of 62°N) caught the majority of grey and harbour seals and harbour porpoises, being 31 out of 40 incidences. Records exist of catches of seals within gillnets deployed in the Barents Sea, during the winter of 1987/88. This was felt to be a result of low capelin stock levels driving seals offshore in search of food. These species are not considered ETP in Norway, but include those for which Norway has accepted responsibility to maintain the population status (e.g. species which are globally threatened or over 25% of the total European population resides within Norwegian waters). The catch rates were noted by the Barents Sea Management Plan to be significantly lower than the allowable sustainable harvest of harp seals. Population status for harp seals is well monitored and incidental mortality rates in the cod fishery are not expected to result in significant population impacts.

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Harbour porpoise interactions with gill nets are well monitored through sampling of the fleet and specific commissioning of vessels to record interactions, and can be examined through the reference fleet. Although some estimates of harbour porpoise by-catch in gill nets of the type used in the fishery have been made, these data do not appear to have been analysed to generate an assessment to be made on the relative impact of fisheries, nor can details be found wrt to the fishery under certification. Impacts from gillnets in Norwegian waters are considered moderate to high.

Seabird interactions have been recorded through the commissioned vessel scheme and have been considered under the BSMP. Seabird interactions have been investigated by the Institute of Nature Research (NINA) as to the significance of such interactions on seabird populations. Available information suggests that bird catches are very low in the gillnet fishery and do not include species of high ETP concern.

**Danish seine**

Interactions of Danish seine gear with sea mammals is expected to be limited. Norway observers witnessed 355 hauls on seine vessels (target species unspecified), and no marine mammal interactions reported. Also contracted commercial vessels have made direct observations (30 hauls) also reported no marine mammal interactions. Evidence therefore supports the estimation that the occasional interaction could occur, but rarely. Interaction between young seals and ‘bottom set nets’, which may include Danish seines, have been noted.

Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in BSMP on indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and Danish seines do not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered. Most interactions with other species are well estimated.

**Hook and line**

In general, the method is felt reasonably species-specific. Negative interactions with sea mammals would not be anticipated with this gear. Information on the distribution of seabirds is being collected through the SEAPOP programme. There is some consideration in BSMP on indirect interactions of birds and fisheries (trophic effects due to removal of biomass and provision of food through discarding). Direct interactions of seabirds and handlines do not appear to have been reliably estimated, but issues associated with other gear types (nets and long lines) have been considered.

**All gears score 80.**

Score: (by gear)
Trawl <b>80</b>
Long line <b>80</b>
Gill Net <b>80</b>
Danish Seine <b>80</b>
Hook and Line <b>80</b>

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Audit trace references
Norwegian Ministry of the Environment (2005); Furness (2003); BSMP Supporting Document, “Utredning av konsekvenser av fiskeri I omraadet Lofoten – Barentshavet”, Fiskeridirektoratet, June 2004, Anon (2010)

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2.4	<b>Strategies have been developed within the fisheries management system to address and restrain any significant negative impacts of the fishery on the ecosystem</b>
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2.4.1	<i>Status</i> The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is <u>unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is <u>highly unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is <u>evidence</u> that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
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<b>Scoring Comments</b>
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**The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.**  
Given the gear-specific nature of habitat interactions, this is discussed on a gear-by-gear basis.

**Trawls**  
The Directorate of Fisheries has issued 14 temporary licenses in 2011 for pelagic trawls. However, only 4 vessels have carried out some limited fishing with this gear; including research to increase selectivity.

The limited use of pelagic gears will essentially eliminate benthic impacts. The key habitat of concern is therefore the pelagic system where impacts are expected to be negligible and transient.

The use of semi-pelagic gear will reduce – but by no means eliminate – benthic impacts. The lower bridle weights used will impact on the sea bed, and may result in considerable localised disruption along the tow. In turn, the footrope is also in contact with the seabed. However, relative to the demersal trawl both the door and bridles will not be in contact with the seabed although other parts of the gear (e.g. the twin-rig ‘clamp’) may cause notable – if localised - disruption. Indeed, the industry reports up to a 30% saving in fuel using semi-demersal trawl, indicating the lower level of drag compared to the demersal trawl.

The majority of vessels use demersal trawls. Demersal trawling has been shown to impact upon sea bed structure and the abundance of cold-water corals etc. The total impact of benthic fishing (trawl and Danish seine) activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed. However, the impacts of trawls are recognised, and research has been performed on the impacts within the Barents Sea, which can be used to infer coastal impacts. The impacts of experimental trawling have been studied on a high seas fishing ground in the Barents Sea. In general, in this muddy, more mobile habitat, trawling was felt to affect the benthic assemblage mainly through resuspension of surface sediment and through relocation of shallow burrowing infaunal species to the surface of the seafloor. However, more significant effects can occur where seabeds are more stable in habitat, and the extent and reversibility of changes depends on the natural disturbance regime and inherent productivity of the system affected. The BSMP process includes a process of Environmental Impact Assessment (EIA) including fishing operations.

Impacts on habitat structure are expected to be reduced by the exclusion of trawling within particular distances of the coast, implementation of trawl free zones and

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implementation of inshore closed areas to protect vulnerable habitats.

The main impacts will occur if fishing moves to new areas, since existing fishing grounds (away from sensitive habitats) will have reached a new equilibrium state. However, sufficient data is collected to detect and evaluate any significant extensions of trawl areas; overall, all fishing positions are recorded accurately through logbook/landing declaration records.

Gear loss can potentially be caused through either (i) an excessive catch (although this usually results in the cod-end bursting rather than loss of the trawl) or (ii) through the gear snagging on the bottom, for example after an engine failure or some other power loss. When gear is lost, position is recorded and retrieval put in place. The loss is extremely rare, with gear retrieval surveys only identifying three parts of a trawl in 2006 in 62 hauls, and not all these will be from the fishery under certification. The ability of an abandoned trawl gear to continue to capture fish is limited, as the trawl gear only fully functions when under powered tow – estimates of impact can therefore be made. If a gear is lost with the doors it will remain in place. If lost without doors, it may drift with bottom currents, although the weight of the gear components will limit this. Under this scenario, some localised damage to benthic structures and communities may be possible through smothering. A complete trawl gear has not been lost in the last 10 years, only one trawl door has been lost in that period.

Overall, all fishing positions are recorded accurately through logbook/landing declaration records, locations of sensitive habitat have been determined in general. The impacts of pelagic gear on the seabed are minor, while those of fully demersal gears have the potential to be significant. Mapping of demersal impacts relative to habitat distribution is needed.

### **Longlines**

Longline operations have limited potential to impact on the bottom habitat. Impacts of longlines on the demersal habitat would stem from the movement of anchors (~30kg) on the sea bed due to currents, and potential snagging and limited smothering and abrasion of the line on key demersal habitats. Bottom-set longlines may snag on benthic epifauna, and irregular objects on the bottom, which may damage or move objects, but often the line breaks and remains underwater and gradually entangles itself and other bottom features. The key determinant of the effects of longlines is how far they travel over the seabed during setting and retrieval, (significant distance is more likely to be covered during the retrieval period). In addition to the line and hooks, anchors can be pulled some distance across the seabed before ascending. In general, however, longline fisheries offer the potential to conduct fisheries without significant habitat damage.

Longlining is permitted in some of the areas closed to towed gears. While impacts on critical habitats (e.g. areas of cold water corals) are known to occur through net retrieval surveys that have been carried out for over 20 years, these are extremely limited due to the limited fishing that would occur in these areas, due to the risk of snagging of gear on sea bed features. It is also noted that vessels can voluntarily avoid areas of coral reef etc to avoid snagging of gear. In comparison to the potential effect of trawls, the impact is considered minor.

Overall, all fishing positions are recorded accurately through logbook/landing declaration records, locations of sensitive habitat have been determined, and the impacts on the sea bed from longline fishing gear are known, and generally considered to be relatively minor (but not negligible).

Loss of longline fishing gear is also rare; losses would require that both ends of the line would need to be lost, or a break in the line to occur at two points for loss of a segment

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of gear to occur. Lines are known to snag on the sea bed and may lead to breakages on hauling. The speed and pressure on the line is monitored to avoid losses, but losses do still occur. In the Norwegian economic zone, retrieval surveys have been performed on a yearly basis. Over 1500m of longline gear was found during the 2005 survey in the “North Norway” area, indicating that the loss of longline gear can be an issue. Estimates from related Norwegian fisheries suggest a maximum of 30 lines being lost per trip, at ~180m per line (although this included the replacement of old lines, which are not actually ‘lost’). Longlines will not ghost fish following the removal or degradation of the bait (a short term issue, estimated to be less than a day), as the bait keeps the hooks off the sea bed. Once removed, the hooks will lie on the seabed and the lack of bait will prevent ghost fishing.

**Gill Net**

Gill nets have the potential to impact on the bottom habitat, but this is most likely only in shallow waters. The gear used principally affects the water column but with anchors on the sea bed (nets would be set 5-6m above the seabed). Impacts would be restricted to dragging of anchors and dragging/entanglement of lost nets. Significant impacts would occur in areas of sensitive benthic communities such as corals and sponges. *Lophelia* reefs are considered good fishing places for net fishing, and evidence of lost gill nets and other types of fishery related equipment has been found (this has been considered within P.I 2.3). Although these fishing techniques can cause breakage and disturbance of corals it was considered that the damage is of limited extent compared to the effect of bottom trawling. In turn, smothering of habitat could occur where nets are lost. The BSMP process includes a process of Environmental Impact Assessment including fishing operations. No unacceptable impacts are anticipated from this gear type and there is no suggestion from evidence collected to date of any significant impacts occurring.

Gill nets can be lost, although vessels must attempt to recover the nets, and the frequency of losses has been reduced by the regulation to tend the net each day. By regulation, if gear remains lost it must be reported to the Coastguard. In the Norwegian economic zone, problems of lost gear over the last couple of decades have been addressed by annual net retrieval surveys. Lost gear seems to arise predominantly from Greenland halibut fisheries (in 2005, 30 of 474 lost nets were from the cod directed fishery). Norway has also introduced management measures on soak time and gill net length. This information allows an estimate of unobserved mortality to be derived. The catching efficiency of lost gill nets is indicated to depend upon depth, and has been examined for some species and areas, but at present no estimate of the total effect is available. Impacts can therefore be calculated from existing data on gear loss, catch rates etc.

**Danish seines**

Danish seine fishing operations have the potential to impact on the bottom habitat. The total impact of benthic fishing (trawl and Danish seine) activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed. However, the impacts of trawling are recognised, and research has been performed on the impacts within the Barents Sea. The impacts of experimental trawling have been studied on a high seas fishing ground in the Barents Sea. In general, trawling is felt to affect the benthic assemblage mainly through resuspension of surface sediment and through relocation of shallow burrowing infaunal species to the surface of the seafloor. There is also the potential for gear to affect the productivity of benthic communities. Although scientific research has been performed to examine this, conflicting results suggest that while certain communities will be adversely affected, others might benefit from increased availability of particular organisms, and that productivity may overall be increased. The BSMP process includes a process of Environmental Impact Assessment including fishing operations. No unacceptable impacts have been identified. In turn, the bottom type is relatively hard and rocky, and hence impacts on benthic structure are reduced. However, as rockhopper gear is not allowed through Regulation, excessively hard and rocky areas will be avoided to reduce damage to gears, and hence greater benthic disturbance may result, although to more dynamic sea beds.

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As a towed gear, Danish seines are excluded through the implementation of closed areas to protect vulnerable habitats. Overall, all fishing positions are recorded accurately through logbook/landing declaration records.

Gear loss can potentially be caused through the gear snagging on the bottom. When gear is lost, position is recorded and retrieval attempts are made as required by regulation. Gear retrieval surveys only identified one part of a Danish seine in 2006 in 62 hauls. The ability of abandoned Danish Seine gear to continue to capture fish is limited, as the gear only fully functions when under powered tow – estimates of impact can therefore be made. If a gear is lost it may drift with bottom currents, although the weight of the gear components will limit this. Under this scenario, some localised damage to benthic structures and communities may be possible through smothering.

**Hook and line**

Hook and line gear is not expected to have impacts on benthic habitat structure. The fishery will have a negligible impact upon the structure and function of the pelagic habitat. The BSMP process includes a process of Environmental Impact Assessment including fishing operations. No unacceptable impacts are anticipated from this gear type and there is no suggestion from evidence collected to date of any significant impacts occurring.

Hooks can be lost if fishing occurs near the sea bed, due to snagging. Ghost fishing with hooks is unlikely, as the hooks are unbaited. However, lost gear could present some minor entanglement risks.

**Score**

**Trawls:** As most trawl gear is demersal (pelagic trawl gear is little used), a score of **75** is awarded to the trawl component.

**Longlines: 75**

**Gillnets: 75**

**Danish seine: 75**

**Hook and line: 95**

**Condition 3 generated for demersal trawlers, Danish seine, longlines and gill nets**

**Audit trace references**

Norwegian Ministry of the Environment (2005); Stiansen et al. (2006); Misund et al. (2005)

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2.4.2	<p><b>Management strategy</b> There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.</p>	<p>There are <u>measures</u> in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. The measures are considered <u>likely</u> to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. There is some <u>objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or habitats involved.  There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p>	<p>There is a <u>strategy</u> in place for managing the impact of the fishery on habitat types.  The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.  There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p>
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**Scoring Comments**

**There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.**  
The primary strategy is based around the regulations underpinning the Marine Resources Act. These provide gear-specific regulations aimed at reducing the impact on target species, other related commercial and non-commercial species, as well as vulnerable ecosystems and ecosystem interactions.

An aspect of potential concern are the impacts of mobile gear (trawls, Danish seines) on areas of biogenic habitat, notably cold-water corals. Whilst gear impacts with sensitive benthos are known to occur, 8 areas of cold water coral have been established under the fisheries legislation to specifically protect coral reefs from damage caused by “gear that is towed during fishing and that may touch the sea floor”, i.e. trawl and Danish seine gears, and further legislation is expected on encounters with corals and/or other vulnerable species or bottom habitats. Further closed areas are being considered in order to protect further vulnerable species and habitats from fishing activity (notably the prohibition on trawling within areas close to shore, in fjords, and the use of towed gears in areas of cold water coral and sponge communities). The coast of Norway is an important nursery ground for many species. Restrictions in fishing inshore and of fishing within fjords will limit direct impacts from gears on juvenile populations in this key area.

Other strategies are operational. For example, there are investigations into semi-pelagic and pelagic gears when fishing for cod and haddock, which virtually eliminate impacts on the sea bed (as well as reducing fuel and gear costs). Ten trawlers are currently operating this gear through derogation.

Longliners have moved to shooting with only one anchor, rather than two, which has the effect of reducing any impacts on the seabed. While not excluded from areas of cold water coral, gear is not shot in these areas as the risk of damaging the gear increases.

Danish seines use light gear which would only have discrete impacts on the seabed.

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Gillnets, while set on the bottom, generally uses a single anchor, unless in busy areas or where there are strong currents. Like longliners, while not excluded from areas of cold water coral, gear tends not to be shot there as the risk of damaging the gear increases.

Regulations specify the requirement to attempt to retrieve lost gear and if unsuccessful report to the Coastguard. In addition for gillnets, regulations require that vessels tend gillnets daily, which reduces gear losses and results in better quality fish. Score 80.

**The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.**  
 The strategies developed in the regulations and Marine Resources Act are based directly on information about the fishery, target species, and habitats (e.g. cold water corals, spawning area closures). The exclusion of towed gears (and operational exclusion of other gears) means that there is high confidence that the strategies will work. Score 100.

**There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.**  
 There is clear evidence that the strategy is being implemented successfully, through logbook records and Coastguard information. The practical assumption can be made that the strategy will be achieving its objectives, and can be monitored through the MAREANO programme. Score 100.

**Score: 95 (All UoCs)**

All SG80 requirements are met and most SG100, hence a score of 95. There is not a complete plan specifically for all ecosystems/habitats but it is considered to be more than a partial strategy and there is evidence of continuing development.

**Audit trace references**

Norwegian Ministry of the Environment (2005); Stiansen et al. (2006)

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<p><b>2.4.3</b></p>	<p><b>Information / monitoring</b> Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.</p>	<p>There is a basic understanding of the types and distribution of main habitats in the area of the fishery.</p> <p>Information is adequate to broadly understand the main impacts of gear use on the main habitats, including spatial extent of interaction.</p>	<p>The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery.</p> <p>Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear.</p> <p>Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p> <p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.</p> <p>Changes in habitat distributions over time are measured.</p> <p>The physical impacts of the gear on the habitat types have been quantified fully.</p>

**Scoring Comments**

**The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.**

The characteristics of the marine ecosystem of the Barents Sea/Lofoten and Norwegian Sea areas are relatively well known. The area, including inshore and fjord waters, is the focus of a large amount of research by IMR and Universities of Bergen and Tromsø on habitats, oceanography, biological distributions, and trophic interactions. Some of these data sets, particularly those examining temperature and salinity, for example, extend back to the 1930s.

A Study Group on Mapping the Occurrence of Cold Water Corals in the Northeast Atlantic [SGCOR] has been set up by ICES, following a European Commission request "to identify areas where cold-water corals may be affected by fishing." An initial report was delivered to the Commission in October 2001 and a more detailed report was produced in 2002. Of relevance to corals identified in inshore areas, physical impacts on coral/sponge etc have been quantified and irreversible changes studied for trawl, a comparable situation to Danish seine fishing. The coincidence of trawling activity with sponge communities has been specifically examined in the Barents Sea. Direct quantitative observations of how much of a reef or reef area had been impacted or destroyed was not possible, but particular areas, e.g. the shallowest part of Sørmannsneset, showed evidence that coral colonies have been affected. Suggestions of damage to coral reefs in Norway amounts to between 30 and 50 % of the total coral area.

Through the ecosystem management plan within the Barents Sea, the areas of vulnerable seabed habitat have been identified (habitat types are mapped both to the north and south of Lofoten) and assessed, including the determination of habitat sensitivity, through numerous research surveys using side-scan sonar and benthic approaches, as well as the active participation of the fishing industry. Information is recent and ongoing for all areas (MAREANO and other programmes underway through IMR and Polar Institute). These have been protected, as noted, including a number within coastal waters that include Fjellknausene and Tisler reefs, and Selligrunnen Reef the world's shallowest

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*Lophelia* reef.

Information is less well advanced for the Norwegian Sea area, although the Ecosystem Management Plan exercise performed for the Barents Sea is expected to be expanded into the Norwegian Sea. Particularly key vulnerable habitats (notably cold water corals and sponge communities) have been identified in detail have been identified and closed areas put in place to protect them. In addition, programmes are underway (primarily the MAREANO programme) to perform studies of the seabed's physical, biological and chemical environment, and identify further key areas in greater detail. This programme is surveying and collating information from offshore (primarily) and coastal waters, while fjord areas are also being examined by IMR and the Geological Survey of Norway under this programme and others. These activities are also related to the SUSHIMAP project which aims to develop a rapid, reliable and cost-efficient procedure for the mapping and monitoring of seabed habitats by integrating medium- and fine-scale data using visual and sediment-grab methods with large-scale bathymetric and backscatter data obtained by multi beam echo sounding, including of fjords. Information is recent and ongoing for all areas (MAREANO and other programmes underway through IMR and Polar Institute as well as information from the fishing industry). **Score 100**

**Changes in habitat distributions over time are measured.**

The research cruises described above are performed and updated on an annual basis, while the MAREANO programme plan is under revision. This time series of information allows the distribution of habitats to be monitored and changes identified. While the main cold water coral areas have been identified, and the key areas protected as described above, the collection of information is ongoing, and includes the gathering of information by fishers, and targeted and annual cruises through echosounder and multibeam mapping.

**Score 100**

**Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).**

Benthic sensitivities are established, (notably for the Barents Sea through the BSMP, but also for the area south of Lofoten with reasonable detail) and as a result particularly sensitive habitat areas are closed to bottom gear, including inshore areas. Following closure, the frequency of monitoring of cold water coral recovery appears reduced.

Currently, vessels over 13m record fishing positions in logbooks, vessels below 13m (primarily inshore vessels) are not required to complete logbooks. However, all landing records record the grid-square within which catch is taken for all vessel sizes and relevant effort. The grid-square system has squares of finer spatial scale closer to the coast. Information is continually updated.

The total impact of fishing activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed, although the data are sufficient for this to be performed, and some analyses have been performed and mapped as part of the MAREANO programme. **Score 80.**

**Score: 95 (All UoCs)**

All of the SG80 requirements are met and most of the SG100, but the total impact of fishing activities, requiring an extensive mapping of fishing effort and bottom habitat across the inshore Norwegian waters region, has not yet been carried out.

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**Audit trace references**

Norwegian Ministry of the Environment (2005); Stiansen et al. (2006); Anon, (2006); [www.mareano.no](http://www.mareano.no)

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2.5	Ecosystem		
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2.5.1	<p><i>Status</i> The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</p>	<p>The fishery is <u>unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>The fishery is <u>highly unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>There is <u>evidence</u> that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>
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**Scoring Comments**

Ecosystem impacts stem from biomass removal and resultant changes in predator prey relationships, as well as potential physical impacts in geographic areas of key importance to the species. These are viewed as part of the Norwegian waters ecosystem as a whole.

**There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.**

Key interactions are thought to be between haddock and other gadoid species, mammals such as harp seals and minke whales, and the capelin (Barents Sea) and other fish that gadoids and mammals both feed upon. Food web studies (Ecopath) of haddock suggest that the species is not a critical prey species of any one predator species identified. There is no evidence of declines in marine mammal populations based on current monitoring information. Sufficient evidence is therefore available on the consequences of current levels of removal of target species to suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.

With reference to non-target species, knowledge of the bycatch of key non-target commercial species is considered well known, given the restrictions on discarding and the inclusion of these catches against specific species quotas. Key species would include major by-catch species such as cod, saithe, ling and tusk, dependent upon the gear. Such gadoid species are the subject of regular stock assessments and advice. Most are also included in Ecopath assessments and are the subject of separate (much larger) directed fisheries. Knowledge of the capture of other non-commercial non-target species remains limited, although the new Regulations will allow a sufficient time series to be developed to analyse this, and the impacts on the population can then be defined. Non-commercial species such as skates and rays would not form significant parts of the demersal/pelagic ecosystem. However, the lack of detail on the species, and quantities, is seen as currently a potentially important data gap.

**Longlines**

Full documentation is kept for the bait used on each trip, species by species. The main bait used in the longline fleet is *Illex argentinus* (squid), caught through jigging in the South Atlantic. Additionally Pacific saury (*Cololabis saira* or *Scomberesox saurus scombroides*) caught by Taiwanese and Korean vessels through purse seining, and reducing amounts of mackerel and Norwegian spring spawning herring caught by Norwegian purse seine vessels is also used. Actual composition of baits is driven by markets, and hence stock abundance. All bait is supplied and stored frozen until used. No live bait is used. Therefore the potential for species or pathogens to be introduced/relocated as a result of the fishery is negligible.

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While the status of these stocks fluctuates due to both fishing pressure and the environment (in particular *Illex*), the impact of the relatively low tonnage of each species used as bait within the fishery, in comparison to the direct fisheries for these species, is expected to be minimal.

**Score: 100 (All UoCs)**

All SG80 and SG100 requirements are met.

**Audit trace references**

Nilssen et al., 1997; Folkow et al., 1997; Stiansen et al. (2006); Anon, (2006); Dingsør et al. (2007);

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<p><b>2.5.2</b></p>	<p><b>Management strategy</b> There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.</p>	<p>There are <u>measures</u> in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem.</p> <p>The measures are considered likely to work, based on <u>plausible argument</u> (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The partial strategy is considered likely to work, based on <u>plausible argument</u> (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).</p> <p>There is <u>some evidence</u> that the measures comprising the partial strategy are being implemented successfully.</p>
<p>There is a <u>strategy</u> that consists of a <u>plan</u>, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> <p>The measures are considered likely to work based on <u>prior experience</u>, plausible argument or <u>information</u> directly from the fishery/ecosystems involved.</p> <p>There is <u>evidence</u> that the measures are being implemented successfully.</p>			

Scoring Comments
<p><b>There is a strategy that consists of a plan, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</b></p> <p>Objectives for the sustainable precautionary management of the haddock stock are in place through the Norwegian management system, with associated controls and reference point levels as defined by the Joint Norwegian- Russian Fisheries Commission (JNRFC).</p> <p>Further strategy is based within the new Marine Resources Act, with the corresponding Regulations defining the plan. The requirement to retain catches of the majority of key species within the haddock fishery and hence the counting of these catches against relevant quotas, represents a key ecosystem management strategy, since the information on non-target catches is now obtained. As yet, levels of non-target catch have not been studied in detail and so their significance has not been fully evaluated (and so strategies not considered). Other measures are in place to protect target and other species, such as temporary closures of areas of high juvenile fish concentrations, closure of areas to fishing, in particular inshore (nursery) areas and fjords, as well as areas of cold water coral.</p>

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Although the strategy takes into account some ecosystem impacts, and considerable ecosystem studies have been performed, the complexity of ecosystem functional relationships means that they are not realistically yet well-understood. Score 80.

**This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.**

The Marine Resources Act and associated regulations provides a near complete strategy to restrain ecosystem impacts. It is noted that there is provision within the Act for the Ministry to lay down a duty to land bycatches of other marine organisms, including plants, marine mammals and seabirds, or a duty to provide reports on such bycatches, although this has not yet been implemented. The Act allows for the designation of further closed areas for ecosystem protection, as well as development of alternative management approaches as is seen fit to protect the ecosystem. Score 100

**The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.**

Based upon experience in other fisheries, and historical data from the fishery under certification, the measures put in place are considered likely to work, and indeed go beyond current general practice particularly in terms of non target species. The collection of additional information provides scope for examination of the ecosystem impacts of fishing and derivation of further measures to mitigate impacts. Score 100.

**There is evidence that the measures are being implemented successfully.**

Evidence of the implementation of the requirement for vessels to land catches of all relevant fish species is available through logbooks and Coastguard information. The effective implementation of closed areas and restricted areas is evidenced by reports and logbook information (for the inshore fleet), combined with Coastguard and Fiskeridirektoratet information. Score 100

**Score: 95 (All UoCs)**

All of the SG80 requirements are met and most of the SG100. Although the strategy takes into account some ecosystem impacts, and considerable ecosystem studies have been performed, the complexity of ecosystem functional relationships means that they are not realistically yet well-understood, hence a score of 95.

**Audit trace references**

Stiansen et al. (2006)

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<p><b>2.5.3</b></p>	<p><b>Information / monitoring</b> There is adequate knowledge of the impacts of the fishery on the ecosystem.</p>	<p>Information is adequate to <u>identify</u> the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity).</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but <u>have not been investigated in detail</u>.</p>	<p>Information is adequate to <u>broadly understand the functions</u> of the key elements of the ecosystem.</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but <u>may not have been investigated in detail</u>.</p> <p>The main functions of the Components (i.e. target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are <u>known</u>.</p> <p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p>	<p>Information is adequate to <u>broadly understand the key elements</u> of the ecosystem.</p> <p>Main <u>interactions</u> between the fishery and these ecosystem elements can be inferred from existing information, and <u>have been investigated</u>.</p> <p>The impacts of the fishery on target, Bycatch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are <u>understood</u>.</p> <p>Sufficient information is available on the impacts of the fishery on the Components <u>and elements</u> to allow the main consequences for the ecosystem to be inferred.</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p>

Scoring Comments
<p><b>Information is adequate to broadly understand the key elements of the ecosystem.</b> Knowledge of the food web related to cod is reasonably well advanced for the Barents and Norwegian Seas, as well as the unique habitats of the fjords, with good quantitative information as a result of stomach content research and other investigations that underpinned the development of the ecosystem management plan in the area. This information has also been sufficient to parameterise ecosystem models. Score 100.</p> <p>Cod is the most important predator fish species in the Barents Sea. It feeds on a large range of prey, including the larger zooplankton species, most of the available fish species and shrimp. Cod prefer capelin as a prey, and feed on them heavily as the capelin spawning migration brings them into the southern and central Barents Sea. Fluctuations of</p>

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the capelin stock have a strong effect on growth, maturation and fecundity of cod, as well as on cod recruitment because of cannibalism. The role of euphausiids for cod feeding increases in the years when capelin stock is at a low level. Also, interannual changes of euphausiid abundance are important for the survival rate of cod during the first year of life. A general relationship between the levels of cod and capelin has been established, but this relationship is not always consistent. For example, links between low capelin, low cod and high seal predation were noted in late 1980s, but other low capelin years didn't show this. Impacts of temperature on food consumption estimates are also being examined.

**Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.**

Multispecies models have been applied within the region (e.g. multi-species Virtual Population Analysis (MSVPA), GADGET, MULTSPEC, AGGMULT, Bifrost, SYSTMOD). Detailed mass-balance trophic models of the Barents Sea have been developed using the Ecopath methodology. This allows the temporal and spatial simulation of alternative fishing and environmental change scenarios to be examined on ecosystem components. The ability of these programmes to derive multispecies fisheries advice is limited by the need for further biological information or the simplifying assumptions that must be made. Trophic relations of larval and juvenile stages have been less well determined. These models have been used to examine the impacts of potential changes in cod levels, due to fishing and other potential causes, on the modelled ecosystem.

The impact of commercial fishing on the spawning stock directly is studied through the ICES stock assessments. The NEA cod stock has recovered above Bpa, which suggests that the ecosystem has not been unduly impacted by fishing on this species. Work using ECOPATH in the Barents Sea has focussed on the impacts of capelin abundance on the ecosystem, suggesting shifts in the reliance of top predators (minke whales, harp seals, and cod) from pelagic species towards predatory demersal fishes. The implications of cod recovery have also been examined through the impacts of increased abundance of adults on recruitment of cod due to cannibalism on potential future projections.

There is a joint IMR/PNIRO project examining the optimal long-term yield of NEA cod, taking into account the effect of ecosystem factors, which uses the EcoCod model (see <http://www.assessment.imr.no/Request/Chapter4.pdf>). High cod levels have increased predation on species such as capelin, which was suggested to have led to the collapse of capelin stocks in 1993-95. Score 100.

**The impacts of the fishery on target, Bycatch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are understood.**

The surveys and simulation modelling performed on information from the Barents Sea allow the impacts of the fishery on components and habitats of the ecosystem, including whale species, to be understood and have been detailed within PI 2. However, it cannot be stated that this covers all species and habitats, and hence not all the main functions are understood (the cod-capelin relationship being an example). Score 80.

**Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.**

The simulation models have been developed for the Barents Sea based upon information collected as a result of stomach content research and other investigations that underpinned the development of the ecosystem management plan in the area. These underpin the ecosystem models and allow the main consequences for the ecosystem to be inferred. However, the time series of information for non-target fish species is short, and further study is needed to fully understand the impacts of the fishery on this component. Score 80

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**Information is sufficient to support the development of strategies to manage ecosystem impacts.**  
 The Marine Resources Act and associated regulations, along with the ongoing research cruises and work of organisations such as IMR and Bergen and Tromsø Universities along with projects such as MAREANO provide sufficient data collection to detect any increase in risk level. **Score 100.**

**Score: 90 (All UoCs)**

All SG80 and some SG100 requirements have been met.

**Audit trace references**

Nilssen et al., 1997; Folkow et al., 1997; Stiansen et al. (2006); Anon, (2006); Dingsør et al. (2007); Furness (2003); Blanchard et al. (2002)

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<b>Principle 3</b>	<b>The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable</b>		
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<b>3.1</b>	<b>Governance and Policy</b>		
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<b>3.1.1</b>	<p><b>Legal and/or customary framework</b> The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;</li> <li>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>- Incorporates an appropriate dispute resolution framework.</li> </ul>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>mechanism</u> for the resolution of legal disputes arising within the system.</p> <p>Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.</p> <p>The management system has a mechanism to <u>generally respect</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes which is <u>considered to be effective</u> in dealing with most issues and that is appropriate to the context of the fishery.</p> <p>The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges.</p> <p>The management system has a mechanism to <u>observe</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes that is appropriate to the context of the fishery and has been <u>tested and proven to be effective</u>.</p> <p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>The management system has a mechanism to <u>formally commit</u> to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>
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<b>Scoring Comments</b>
Northeast Arctic fisheries are subject to a management system that is basically compliant with relevant international conventions and agreements. The management system are

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based on the 1982 Law of the Sea Convention, the fisheries-related provisions of which states that fisheries are to be managed sustainably, that they should be optimally used, and that states shall cooperate on the management of shared stocks. These provisions are basically complied with by the management system in question.

The fisheries are managed according to the principles set out in the FAO Code of Conduct for Responsible Fisheries, which includes the application of a precautionary approach. Also, the requirements in the 1995 UN Fish Stocks Agreement regarding reference points and application of the precautionary approach are complied with for this fishery. Norway has implemented actions against IUU fishing in accordance with the FAO Global Plan of Action against IUU fishing (relevant for P1 of this assessment).

Fisheries in Norway are subject to comprehensive legislative/regulatory framework. The management system is demonstrably compliant with national legislation, and has a clear legal basis. Secondary legislation providing for actual regulations and enforcement provisions builds on overarching fisheries laws notably the new Oceans Resources Act, , adopted by Parliament in 2008.

The management system is subject to legal reviews in court cases, for example when regulations are contested by fishers. Such court cases usually result in the resource management being found to be consistent with legislation.

Rights are clearly codified in the legislation concerning participation in fisheries. The legislation has been developed through legally based, democratic processes whereby draft legislation is prepared by expert committees with broad representation, also from various stakeholder groups. When the Ministry of Fisheries have prepared draft legislation, comprehensive written hearings are conducted and the results taken into consideration, before the new legislation is submitted to Parliament for adoption. The review of new legislation in parliamentary committees can be result in changes to what is proposed by Government.

Disputes can be resolved in the first instance by negotiations within the system, for example in preparations before or in regulatory meetings. The Minister would make a decision on a particular issue. Further dispute could then be resolved through law. These mechanisms are transparent and tested and proven to be effective.

Disputes over resource allocation between groups in the industry are normally resolved within the industry, by way of negotiation of compromises in the Norwegian Fishers Union. For this stock, the industry has negotiated a key for allocation of fishing rights between various vessel groups.

More serious disputes between actors in the industry are also usually resolved in the courts. Legal systems have been well tested in this regard.

Ultimately, any Norwegian citizen or organisation can take legal action to the Council of Europe Court.

The management system in Norway is comprehensive and encompasses the entire fishery (as well as other fisheries) and those participating in it, including participation of fishers from other nations. An ecosystem scale management plan has been implemented in the Barents Sea and is being developed for the Norwegian Sea (adopted 2009). Management is considered to be consistent with the cultural context, scale and intensity of the fishery.

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<b>Score: 95 (All UoCs)</b>
All SG80 and most SG100 requirements are met.
<b>Audit Trace References</b>

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<p><b>3.1.2</b></p>	<p><b>Consultation, roles and responsibilities</b>            The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>generally understood</u>.</p> <p>The management system includes consultation processes that <u>obtain relevant information</u> from the main affected parties, including local knowledge, to inform the management system.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood</u> for <u>key areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</p> <p>The consultation process <u>provides opportunity</u> for all interested and affected parties to be involved.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood</u> for <u>all areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information and <u>explains how it is used or not used</u>.</p> <p>The consultation process <u>provides opportunity and encouragement</u> for all interested and affected parties to be involved, and <u>facilitates</u> their effective engagement.</p>
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Scoring Comments
<p>The management system in Norway includes a comprehensive consultative process where stakeholders are invited to have their say regarding regulations and the regulatory approach. The key arena for this is an open Regulatory meeting (previously the Regulatory Council) chaired by the Directorate of Fisheries, where the regulatory measures for the previous year are reviewed and proposals for regulatory measures the coming years are discussed. Meeting papers are posted on the web in advance of meetings. The meetings are open and all relevant stakeholders have an opportunity to attend and make representations. Stakeholder attendees at this meeting include including representatives from the Norwegian Fishermen’s Association, Federation of Norwegian Fishing Industries, the Norwegian Seamen’s Union, The Norwegian Food and Allied Workers’ Union, The Sami Parliament, environmental NGOs, the regional counties, as well as recreational fishermen.</p> <p>When new legislation is developed, comprehensive hearings are mandated by Norwegian law, providing the industry as well as other stakeholders with an opportunity to comment upon and influence new legislation. The views presented in commentary to draft legislation would be reflected in the Ministries comment to draft legislation presented to Parliament.</p> <p>Also, annual meetings of fishers’ organisations are important venues for presentation of science and policy developments and dialogue between fisheries and scientists and administrators. Stakeholders also have the opportunity to participate in preparatory meetings before the annual negotiations with the Russia. Representatives from the fisheries organizations can also participate in the delegations to the talks.</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Decisions regarding management of the stocks thus specifically address stakeholder concerns, and the consultations processes provide opportunity for all interested parties to be involved and facilitates their engagement.

**Score: 95 (All UoCs)**

**All SG80 and most SG100 requirements are met.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<b>3.1.3</b>	<b>Long term objectives</b> The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach.	Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>implicit</u> within management policy.	<u>Clear</u> long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>explicit</u> within management policy.

Scoring Comments
<p>Long-term, overall goals for fisheries management are set out in legislation and in reports to the Parliament. These objectives are based upon sustainable management, economic efficiency, regard for regional objectives (e.g. specification of landing points), as well as concern for work conditions and safety. Modern environmental principles as the precautionary approach and the ecosystem approach are now explicit objectives of the fisheries legislation, as the new Oceans Resources Act generally places more emphasis on environmental objectives. Environmental objectives are in place and observed, e.g. in relation to protection of coral reefs and geographically defined sea-based management plans (e.g. Barents Sea Management Plan and other forthcoming plans). Ecological quality objectives are also developed through the OSPAR cooperation, but fully developed measures to measure environmental performance are not yet in place. Ecological Quality Indicators are in the process of being developed.</p> <p>Long-term objectives for fisheries management are explicitly set out in the management plan for the stock (notably the Harvest Control Rule). Short-term objectives are represented by annual TACs, the performance against which can be measured on an annual basis. The TACs are based on ICES advice, which builds on the precautionary approach by following the agreed Harvest Control Rule which is required by the management policy. IUU fishing is an ongoing issue and objectives and measures to reduce this have been developed and appears to be effective, particularly in recent years. Specific environmental control measures are in place (e.g concerning prevention of discarding of key commercial species), but do not yet fully address all potential effects of the fisheries.</p> <p>The precautionary approach is formalised and implemented in the management of all major fish stocks in the Norwegian and Barents Seas. ICES advice is based on established precautionary and limit reference points, and increasingly MSY considerations. These are supported by an additionally precautionary management strategy, which would be applied should the stock fall below <math>B_{lim}</math>, with the aim of achieving MSY levels (or greater). However, management has not followed ICES advice for coastal cod (for which zero catch is advised), given economic and social issues. Instead, management has introduced alternative approaches to reduce coastal cod catch levels. These have culminated in the development of the coastal cod recovery plan, which ICES views as consistent with the precautionary approach and likely to lead to significant rebuilding. .</p> <p>Some ecosystem interactions, such as by-catches of non-regulation species and restriction on all gear fishing in areas of coral within the Norwegian fleets do not, however, appear to be fully identified and/or constrained by formalised precautionary procedures.</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Score: 95 (All UoCs)</b>
SG80 requirements are met and most SG100. As there is one issue for this PI, a partial score of 95 is allocated.
<b>Audit Trace References</b>
ACOM (2010c)

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100	
<b>3.1.4</b>	<b>Incentives for sustainable fishing</b> The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and <u>explicitly considers</u> incentives in a <u>regular review</u> of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

Scoring Comments
<p>All major fisheries in Norway are closed, in the sense that access to the fishery is limited to vessels that have a permit to participate in the fishery. The Participation Act of 1999 regulates who can fish for a living. A vessel may not be used for commercial fishing unless a commercial licence has been issued. Only Norwegian citizens and active fishermen can be issued a commercial licence. In turn, most commercial fisheries have limited entry. Participation in the coastal fleet is limited by annual permits. A system of sanctions is designed to deter illegal activities and promote sustainable fishing practices. Ultimately, temporal removal of permits, in the event of recurrent serious breaches of management requirements, provides an incentive to promote sustainable fishing.</p> <p>All quotas are allocated to specific groups of vessels. Quotas are allocated to vessels, or there is a maximum quota for what a single vessel can take of its group quota. In addition to the regulations of access and output, technical regulations also contribute to the achievement of the goals of fishery management: sustainable use and economic efficiency. Procedures to allow for a managed reduction in capacity are established and tested.</p> <p>Also ecosystem concerns are taken into account: the regulations prohibit fishing in areas with coral reefs with specified gear, allow for closing of areas with high levels of juvenile fish, and prevents discarding of specified species. Economic gain of landing quota overshoots is also removed (values are taken through the sales organizations).</p> <p>Overfishing and fishing in breach of regulations results in economic penalties. Such breaches are generally negatively considered within the industry. Over the last two decades the level of understanding for the need for resource conservation and effective measures to achieve that has increased greatly, and today fishers are generally supportive of government regulations, although they may disagree with their actual design and implementation. Interventions on inshore fishers are primarily through stronger management regulations which aim to restrict fishing periods and areas for specific gears (e.g. coastal cod), rather than restricting fishing access. While these have been effective in halting increases in coastal cod catches, their inability to produce a recovery in the coastal cod stock has led to the development of a recovery plan to achieve this. The recovery plan will require reduction of effort applied to the coastal cod stock (which can be achieved through a range of approaches) to be successful.</p> <p>Also, the perception of fisheries as an environmental issue has brought fisheries under the attention of the “public eye”, which may also provide an incentive to sustainable</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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fishing practices.

In sum, these measures explicitly considers incentives that contribute to sustainable fishing and ecosystem management.

The system has no subsidies that contribute to unsustainable fishing or ecosystem degradation. Subsidies were terminated in 1990 through an agreement between the European Free Trade Area signatories, negotiated in preparation for the EEA agreement.

Regular reviews of management policy may contribute to sustainable fishing practices. This includes reviews of the management plans for (e.g.) the ecosystem of the Barents Sea.

**Score: 95 (All UoCs)**

**SG80 requirements are met and most SG100. As there is one issue for this PI, a partial score of 95 is allocated.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.2	<b>Fishery- specific management system</b>		
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3.2.1	<b>Fishery-specific objectives</b> The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.	<u>Objectives</u> , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>implicit</u> within the fishery's management system.	<u>Short and long term objectives</u> , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>explicit</u> within the fishery's management system.	<u>Well defined and measurable short and long term objectives</u> , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>explicit</u> within the fishery's management system.
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<b>Scoring Comments</b>
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Within Norway, the resource is closely monitored annually through fishery dependent and independent indices (as described under Principle 1). This includes the reference fleet which generates information on by-catches and associated species and is coordinated by research organisations.

Logbook and/or landing records are kept at close geographical and temporal scales and are immediately transmitted to management and research organisations.

An important area of uncertainty, however, is IUU fishing, although this is reduced and considered to be estimated in a precautionary manner and included in the basis for ICES advice.

Monitoring results are evaluated quantitatively within the stock assessment process, on an annual basis against the precautionary target and limit reference points within ICES.

The fisheries are continuously monitored. At sea, a service for surveillance of the fisheries can close an area for fisheries should the amount of undersized fish or bycatch be to high on very short notice (hours). Such areas closures are frequently used. Areas are re-opened when by-catches and other incidences are at acceptable levels.

Landings data, almost all of which are electronic, is transmitted to the Fisheries Directorate within few days. The authorities, and the sales organizations in their districts, therefore have almost real time overview over the development of fisheries and can stop them when quota limits are approached. This applies also to vessels in fisheries where vessel quotas are used.

The principal shortcoming is the generic problem within fishery monitoring, assessment and management regimes, i.e. the 18-24 month time between an event in the stock occurring, the ICES assessment being completed and appropriate management action being agreed. Once appropriate action has been agreed, in Norway there are well documented and tested procedures to implement changes rapidly.

The total catches have, in recent years, been above the TAC level, due to IUU fishing mainly in Russian waters. Levels of IUU fishing appear, however, to have been reduced

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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over the last years, following a number of measures that appears to be effective, and are now considered zero.

Long and short term objectives are demonstrably consistent with achieving the outcomes of MSC principles 1 and 2 and are explicit within the management system.

**Score: 90 (All UoCs)**

**SG80 requirements are met and some SG100. As there is one issue for this PI, a partial score of 90 is allocated.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>3.2.2 Decision-making processes</b> The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives.</p>	<p>There are <u>informal</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>serious issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take <u>some</u> account of the wider implications of decisions.</p>	<p>There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>serious and other important issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p><u>Explanations</u> are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p>	<p>There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>all issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p><u>Formal reporting</u> to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p>

Scoring Comments
<p>The Barents Sea stocks as a whole are shared 50-50 between Norway and Russia, and has implications for coastal management in Norway, in terms of the TACs to be allocated. A 1975 agreement establishes a Joint Fisheries Commission, and a 1976 agreement on reciprocal fisheries rights establish the conditions for the cooperation. Organizations, management responsibilities and interactions are clearly defined within the three core areas of resource management: developing the knowledge base, preparing and implementing regulations, and enforcing them. Interactions are however not always immediately effective in the sense of decisions being promptly followed up upon or abided by. There are well established decision-making procedure both at the international and the national level of governance. Decision-making processes use the precautionary approach and are based upon the best available information. As noted in 3.1.4, activities to support coastal cod have focused on inshore interventions through stronger management regulations which aim to restrict fishing periods and areas for specific gears (e.g. coastal cod), rather than restricting fishing access.</p> <p>The knowledge base for resource management of the stock as a whole is developed by the Institute of Marine Research in Norway (in collaboration with PINRO in Russia for the stock as a whole, and there is a longstanding tradition for cooperation). There is close cooperation on research planning, data collection, including joint research cruises, and the development of assessment models. The work of IMR and PINRO is the basis for the scientific advice for resource management to the Joint Fisheries Commission provided by ICES. Additional scientific inputs on marine ecosystems issues are provided through other research institutions (Universities and other research institutes). For</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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inshore waters, further targeted research is provided by IMR and a range of other Norwegian national research and advisory bodies.

The formal responsibility of the Joint Commission is to recommend TACs on joint stocks to the fisheries authorities in Norway and Russia. A catch control rule sets out how TACs can be modified from year to year. In Norway, the overall responsibility for resource management resides with the Ministry of Fisheries and Coastal Affairs, which decides on policy and regulatory schemes. The Fisheries Directorate acts as a technical body preparing the secondary legislation containing regulations and implementing it. Interactions between the Ministry, Directorate and IMR appear to function well, with well established decision-making procedures that provides stakeholders with information on how the decision-making system responds to information from research and reviews.

Relevant environmental objectives are applied through regulation and enforcement activities as for fishery controls, for example measures for lost gear retrieval.

The regulations of fisheries activities are reviewed annually in the Regulatory Meeting, ensuring transparency of management operations and providing for testing and review of regulatory mechanisms. Regulations are clearly communicated to operatives and fishers are required to be aware of relevant regulations.

**Score: 95 (All UoCs)**

**All SG80 and most SG100 requirements are met.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>3.2.3 Compliance and enforcement</b></p> <p>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.</p>	<p>Monitoring, control and surveillance <u>mechanisms</u> exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.</p> <p>Sanctions to deal with non-compliance exist and there is some evidence that they are applied.</p> <p>Fishers are <u>generally thought</u> to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.</p>	<p>A monitoring, control and surveillance <u>system</u> has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.</p> <p>Sanctions to deal with non-compliance exist, <u>are consistently applied</u> and thought to provide effective deterrence.</p> <p><u>Some evidence exists</u> to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.</p> <p>There is no evidence of systematic non-compliance.</p>	<p>A <u>comprehensive</u> monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.</p> <p>Sanctions to deal with non-compliance exist, are consistently applied and <u>demonstrably</u> provide effective deterrence.</p> <p>There is a <u>high degree of confidence</u> that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p> <p>There is no evidence of systematic non-compliance.</p>

Scoring Comments
<p>Generally, the level of understanding of how the management system works and the grounds for its structure and functions is high in the Norwegian fishing industry. This is important given the number and complexity of regulations applying to the fishery, and to a fishery operative it is actually an asset to be well informed about the management system, as this facilitate his operations. Fishers therefore have a strong incentive to have comprehensive knowledge about the aims and methods of the management system. The various actors involved in enforcement coordinate their activities in several meetings annually. A strategic approach is taken where enforcement activities are directed towards areas where the effect is expected to be largest.</p> <p>A comprehensive monitoring, control and surveillance system is in place, with inspections at sea as well as on landing. Also post-landing checks of reported landings against quotas are performed for each vessel. A satellite based vessel monitoring system applies to all vessels above 21 metres. All vessels &gt;13m are required to keep detailed logbooks, which are checked upon during inspections. Vessels &lt; 13 meters have less detailed reporting requirements, but still provide the information necessary for management purposes. For inshore fisheries, monitoring generally focuses at landing, although at sea monitoring by the Coast Guard also occurs on issues such as the capture of undersized fish and illegal discarding. Given the 'risk-based' approach to the targeting of enforcement activity, identification of increased infringements of regulations in the coastal sector would lead to further at-sea coverage.</p>

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The key document in landings control is the contract note, which is completed for each landing. The contract note contains a significant number of items of information relating to the landing. All contract notes are checked against the central register of landings in the Fisheries Directorate. Almost all contract notes are submitted in electronic form.

Violations of regulations are consistently subject to sanctions which demonstrably provide an effective deterrence against violations. Misreporting is subject to strict penalties, and there is generally a high degree of compliance with regulations. It is therefore a high degree of confidence that fishers comply with the management system. There is no evidence of systematic non-compliance.

In cases of non-compliance, a range of penalties can be applied by the authorities, with temporary loss of fishing license and heavy economic sanctions as the most severe measures. For minor infringements a series of warnings can be issued. Corrective actions are consistently applied and severe infractions are tried in the courts, which over time have developed a consistent practice in this regard. Corrective actions are well established, codified, understood and tested.

Also, selected prosecutors are specifically trained for pursuing fisheries cases.

The level of compliance is relatively high. Data from inspections at sea and upon landings indicate that the number of serious infractions is relatively low. The management system in general has a high level of legitimacy among fishers, and the need to manage resources through restrictions on access and execution of the fishery is well understood. On the other hand, the number of infractions is not insignificant, indicating that even though the need for management is well understood, rules are not always abided with, albeit with no indication of consistent violation.

**Score: 95 (All UoCs)**

**All SG80 and most SG100 requirements are met.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>3.2.4</b></p>	<p><b>Research plan</b> The fishery has a research plan that addresses the information needs of management.</p>	<p><u>Research</u> is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research results are <u>available</u> to interested parties.</p>	<p>A <u>research plan</u> provides the management system with a strategic approach to research and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion.</p> <p>A <u>comprehensive research plan</u> provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research <u>plan</u> and results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion and are <u>widely and publicly available</u>.</p>

Scoring Comments
<p>Specifically to fisheries management, the strategic plan of the Institute of Marine Research, which is an independent body funded in part the Ministry of Fisheries and Coastal Affairs, points to critical areas for marine research for fisheries management. This is followed up upon with annual research plans that are developed in consultation with the Ministry. The Ministry review the issue of research needs in a relatively detailed manner in its annual budget propositions to the Parliament. On the basis of this, a detailed set of instructions on research priorities are communicated to the Institute of Marine Research. These priorities are arrived at in dialogue between the institute and the fisheries authorities.</p> <p>In general, the demands by management for scientific information that is relevant for the development of annual regulations tend to set the agenda for IMR research in this regard.</p> <p>Also, the fishing industry has its own research fund, funded by a levy on exports. These funds are governed by the industry itself and target more immediate applied research needs identified by industry.</p> <p>In the bilateral cooperation with Russia, detailed plans for scientific cooperation on designated issues are regularly prepared.</p> <p>Substantial resources are committed to this over time. The annual budget of the IMR is about USD 100 million. The activities of IMR are closely related to the needs of the management system, including routine research surveys etc and addressing more particular scientific questions related to management plans. The science funded by the Research Council is also directed towards both applied and developmental marine science. Clear research programmes are implemented to address the identified research requirements. The Barents Sea stocks support major fisheries and therefore have substantial research time and resources committed to them in order to fulfil the needs of management for scientific based information. An example of this is the research to underpin the design of the recovery plan for coastal cod, which involved the Ministry, Fiskeridirektoratet, industry, IMR, and ICES in its design and evaluation, which has provided timely the best available scientific information to underpin the plan.</p>

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ICES also provide a forum for integration of research from a variety of sources. Norwegian researchers are fully engaged with ICES working groups and the ACFM. Research plans and results are widely disseminated and publicly available.

**Score: 90 (All UoCs)**

**All SG80 and some SG100 requirements are met.**

**Audit Trace References**

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p><b>3.2.5 Monitoring and management performance evaluation</b> There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.</p> <p>There is effective and timely review of the fishery-specific management system.</p>	<p>The fishery has in place mechanisms to evaluate <u>some</u> parts of the management system and is subject to <u>occasional internal</u> review.</p>	<p>The fishery has in place mechanisms to evaluate <u>key</u> parts of the management system and is subject to <u>regular internal</u> and <u>occasional external</u> review.</p>	<p>The fishery has in place mechanisms to evaluate <u>all</u> parts of the management system and is subject to <u>regular internal</u> and <u>external</u> review.</p>

Scoring Comments
<p>The overall performance of the management regime for the resource is measured annually by assessing the status of stocks. This is a tested procedure that is repeated annually under the purview of ICES, resulting in new stock assessments and scientific advice for the following year.</p> <p>IMR carry out ecosystem surveys annually and fishery independent stock surveys in cooperation with its Russian counterpart, PINRO. Some measures are difficult to fully enforce, however, such as the ban on discarding, which can influence the meeting of objectives. Also overfishing is measured by means of various methods and is included by ICES in the statistical material that constitutes the basis for scientific advice. Well tested procedures are applied by ICES to measure management performance against the biological objectives of management.</p> <p>The management system at the domestic level in Norway is subject to several annual internal reviews. Regulatory meetings (2-3 per year) are hosted by the Directorate and attended by industry and other stakeholders. Significant preparatory documents are made available to stakeholders on the web prior to the meeting. At these meetings, the regulatory program – quota and technical regulations - (for each fishery individually, e.g. Northeast Arctic cod and haddock fisheries) that is implemented in any one year is subject to review by the Regulatory meeting the following year. Recommendations on modifications to regulation are proposed to the Ministry and subsequent decisions are subject to ongoing testing and monitoring.</p> <p>At the level of bilateral cooperation between Norway and Russia, relevant to coastal fisheries, the annual meetings of the Commission review developments in fisheries and their management over the past year. At the level of bilateral cooperation between the two countries, no systematic reviews are performed. The cooperation has however been examined in numerous scientific publications, which can be said to constitute external reviews. The national audit offices of the two countries has also performed a major review of the functioning of the management regime.</p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Regulations are also subject to continuous public debate and review. This applies to rules regulating access, output, and technical regulations.

Data and assessment methodology is subject to continuous internal scientific review within ICES, with participation by scientists from many countries. Methodologies are subject to continuous development, such as ICES Working Groups on Arctic Fisheries and Limit and Target Reference Points and Study Group on Management Strategies (SGMAS). There is no established stock assessment quality control procedure within Norway, outside of the ICES framework.

Regular and frequent external review of regulations and enforcement aspects occurs annually (since 1995) through a report to Parliament addressing the outcomes of international agreements and their implementation in fisheries policy. The parliamentary committee review and comment upon the ministerial report and the minister will act on comments made.

A major review of the management system was carried out by the National Audit Office in 2003-2004. This was a review of the effectiveness of the management system (in terms of resource management, capacity handling, enforcement and Ministerial management of subsidiary bodies – Directorate, IMR etc), and was reported to Parliament. The overall aim of these reviews is to ensure that the executive is achieving the overall policy objectives adopted by Parliament.

The Institute of Marine Research has been subject to two major scientific reviews over the last decade or so by independent committees (one commissioned by the Research Council covering a number of institutions, one specifically commissioned by IMR itself). In additions, the research is published in scientific journals and is subject to regular peer review processes there.

ICES involve external scientists in reviews of its methodologies on a regular basis. In particular, the decision rules for the cod and haddock stock have been reviewed externally by ICES to confirm conformity with the precautionary approach.

Norway reports bi-annually on the performance of its management system to the Committee of Fisheries of FAO, which reviews countries performance relative to the standards set in the 1995 FAO Code of Conduct for Responsible Fisheries.

**Score: 95 (All UoCs)**

**SG80 requirements are met and most SG100. As there is one issue for this PI, a partial score of 95 is allocated.**

**Audit Trace References**

## **Appendix B: Client Action Plan**

## **Action Plan for Meeting the Conditions for Certification of the Norwegian North East Arctic inshore Cod and Haddock Fisheries**

The Norwegian Seafood Export Council, on behalf of the Norwegian Seafood Industry (NSI), submits this Action Plan for meeting the Conditions for Certification of the Norwegian North East Arctic inshore Cod Fisheries and the Norwegian North East Arctic inshore Haddock Fisheries. As the Conditions for Continued Certification are the same for the fisheries on both stocks, the Action Plan similarly applies to both stocks. NSI agrees to make a good faith effort to meet the intent of the Conditions set forth in the certifier's March 2011 Client Review Draft Report determining that the NSI North East Arctic inshore Cod and inshore Haddock fisheries are sustainably managed under the MSC Principles and Criteria for Sustainable Fisheries.

NSI has set up a permanent formal advisory committee within, and reporting to, the Board of the Norwegian Seafood Export Council. To assist and complement the client (Seafood Export Council) in the certification procedure and to structure the follow-up of actions required, a working group is formed on the basis of the formal advisory committee. The advisory committee and the associated working group will monitor and follow up the actions required to meet the Conditions for Certification of the Norwegian North East Arctic inshore Cod and Haddock Fisheries.

Here the conditions and the NSI comments and planned action are addressed:

### **Condition 1. Retained species status**

The fishery must meet the overall SG80 requirement within the timescale of this certification, i.e. Main retained species should be highly likely to be within biologically based limits, or if outside the limits there should be a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.

**Timescale:** Initial evaluation of any potential impacts should at least be planned by the first surveillance audit, underway by the second surveillance audit and completed by the third audit. Where further mitigation measures are required to reduce or avoid impacts, these should be identified within 3 years of certification and implemented by the fourth surveillance audit.

In meeting this condition, the client should note the following specific issues:

1. To assess the impacts of catches of non-target species in relation to the distribution, ecology and abundance of the species and populations affected, notably for elasmobranchs. For coastal cod it is noted that a strategy is in place to allow for recovery and rebuilding, the rebuilding progress will be monitored and reported at subsequent annual MSC surveillance audits. Further action, such as in-season monitoring of coastal cod catch rates and subsequent management action, may be required and this will be discussed as needed during future audits.
2. The potential impact of non-target species removals on the populations affected and the wider ecosystem should be evaluated.
3. Where assessments of impacts on these species are shown to be significant, appropriate measures to reduce catches to acceptable and precautionary levels shall be developed and implemented.

### **NSI comments and action plan:**

The specific concern of the assessment team under Condition 1 relates to the impacts of catches of non-target species in relation to the distribution, ecology and abundance of the species and populations affected, notably for elasmobranchs.

A formalized systematic collection of gear specific data on potential interaction with endangered, threatened or protected species (ETP), or any other commercially uninteresting species for that matter, admittedly does not exist. However, NSI has already raised this issue with the relevant authorities as part of our addressing of conditions for continuing certification of the Norwegian Saithe Fisheries (letter from Fiskebat dated February 19<sup>th</sup> 2009 to Institute of Marine Research, Ministry of Fisheries and Coastal Affairs, and Directorate for Fisheries). Formalized procedures within the reference fleet has been introduced, and this fleet is now obliged to register “rubbel og bit” (“all included”). Such an “all in” registration procedure within the reference fleet would be valuable with respect to any potential non-target and/or ETP challenge. In addition Norwegian regulations passed in 2009 provides for a mandatory landing requirements for *all* catches.

#### Action 1 and 2:

NSI has advised The Institute of Marine Research to implement obligation for the reference fleet to register all species in the catches.

Within three years of final certification further assessments of the distribution, ecology and abundance of retained non-target species shall be conducted, on the basis of findings in the “all in” registration procedure and other information from mandatory landing requirement / landing notes.

Where assessments of impacts are shown to be significant, appropriate mitigation measures to reduce or avoid impacts shall be identified within 3 years, and implemented within 4 years, of final certification.

The target of having a gear specific catch recording of any species taken in the various fisheries, including, but not limited to ETP species, in the reference fleet during 2010, is fulfilled.

#### **Condition 2. Endangered, threatened and protected (ETP) species**

The fishery must meet the overall SG80 requirement within the timescale of this certification, i.e. *The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.*

*Direct effects are highly unlikely to create unacceptable impacts to ETP species.*

*Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.*

**Timescale:** A review of interactions should be completed, and any significant interactions identified by the first annual surveillance audit. Appropriate mitigation measures should be implemented by the second annual surveillance audit.

In meeting this condition, the client should note the following specific issues:

1. The information now collected from the fishery under new regulations and programmes should be examined to quantify the extent of interactions. Where interactions are found to be unacceptable the fleet should implement appropriate actions (e.g. formalisation of the use of bird-scaring devices) to minimise interactions or eliminate mortalities of these species.

**NSI comments and action plan:**

See comments given under Condition 1

**Action 3:**

Where interactions of ETP species and/or non-target non-ETP species are found to be unacceptable, appropriate measures are to be proposed and introduced within 24 months following final certification.

**Condition 3. Habitat**

The trawl, Danish seine, longline and gill-net fisheries must meet the overall SG80 requirement within the timescale of this certification, i.e. *The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.*

**Timescale:** An assessment should be planned by the first surveillance audit, underway by the second surveillance audit and completed by the third audit. The identification and implementation of appropriate management measures for each gear type should be undertaken within the term of the current certification.

In meeting this condition, the client should note the following specific issues:

1. An assessment of the potential impact of trawl, Danish seine, longline and gill net fishing within known sensitive habitats, notably identified areas of cold water coral, should be undertaken. If a potentially significant impact is identified, an appropriate management action should be implemented. It is noted that vessels may voluntarily avoid such areas; formalisation of such procedures may be one appropriate mechanism to address this.

**NSI comments and action plan:**

It is suggested that any impact on cold water corals from Trawls, Danish seine, longline and gill-net should be assessed. We find the suggestion valid and have proposed assessments of this potential effect as an integrated part of on-going coral examination projects by IMR and Directorate of Fisheries. NSI will start making preparations and work with partners in the IMR and the Directorate of Fisheries with aim to make assessment of gear types described in condition 3 within the timeframe specified. Within 3 years following final certification, an assessment of potential negative impacts from each of these gears (trawl, Danish seine, longline and gill-net) shall be conducted.

Within 5 years following final certification, if significant negative impacts from these gear types are found to exist, appropriate management measures shall be developed and implemented.

**Action 4:**

NSI has already proposed further developments to the IMR coral reef mapping programme to include an assessment of fishing effort and impacts from fishing with gear other than trawl and Danish seine, in areas protected from fishing with these two gear types as a measure to protect known cold water coral concentrations (letter from Fiskebat dated April 8<sup>th</sup> 2010 to Institute of Marine Research and Ministry of Fisheries and Coastal Affairs). The Ministry responded in a letter dated June 2<sup>nd</sup> 2010, stating that it is currently working on an internal action plan for corals, and that an assessment of this issue will be included

in this.

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Re-submitted September 2011 by The Norwegian Seafood Export Council on behalf of the Norwegian Seafood Industry Advisory Committee, appointed by the national industry organizations representing all fleet and shore based industry groups of Norwegian fisheries.

## Appendix C: Peer Review Reports

### Peer Reviewers

**Dr Michael Gregg Pawson.** Mike Pawson recently retired as senior fisheries advisor at Cefas, Lowestoft, after 39 years carrying out biological research and providing scientific advice to Defra, the EC and other national and international organisations on fish stock abundance (salmonids, eels, marine teleosts and elasmobranchs), technical conservation measures and fisheries management regulations, and on related monitoring, sampling, survey and research programmes. Between 1974 and 1980 he initiated and led acoustic surveys for blue whiting and mackerel, and trawl surveys in the North Sea and, from 1980 to 1990, designed and managed MAFF's coastal fisheries programme, implementing biological sampling, trawl surveys, a fishermen's logbook scheme and socio-economic evaluation of sea bass fisheries. Between 1990 and 2002 Mike led the Cefas Western demersal team, providing analytical assessments and management advice for 12 finfish stocks and, since 2002, directed and managed the assessment of salmon and eel stocks in England and Wales and provided scientific advice on their conservation.

During this time he was co-ordinator of the Anglo-French English Channel Fisheries Study Group (1989-1997), chairman of the ICES Southern Shelf Demersal Stock Assessment Working Group (1996-98), Seabass Study Group (2000-04) and Elasmobranch Study Group (2001-02), and initiated and managed EU-funded multi-national projects on methods for egg-production stock biomass estimation, bio-geographical identity of English Channel fish stocks, bio-economic modelling of Channel fisheries, development of assessment methods for elasmobranchs, marine recreational fishing in Europe etc. He recently managed the preparation of 9 Seafish responsible sourcing guides.

Mike has provided scientific evaluation, quality assurance and advice to several national and EC-funded projects on fisheries biology, monitoring and assessment, and one of his major roles over the last 15 years has been peer-reviewing scientific papers, project proposals, reports and manuscripts in preparation. All of Mike's work has been published in refereed Journals, in ICES and EC working group reports, and in contract reports.

**Jake Rice.** Jake is based at the Canadian Stock Assessment Secretariat, Department of Fisheries and Oceans, Canada, where he is responsible for coordinating all national and regional processes for peer review and provision of scientific advice on fisheries and marine science issues. The job includes integrating traditional knowledge with scientific results (and fishers with scientists at peer review meetings), thereby ensuring all review processes are open and transparent to all clients, while maintaining highest standards for objectivity and scientific quality. He is responsible for organising and chairing review meetings and workshops on trans-regional topics, chairing many national working groups, and serving as Headquarters liaison for many Regional science review and advisory groups. Jake also represents Canada at many international fisheries science bodies. He retains some research activities of international stature, particularly in the areas of ecosystem management and the effects of fishing on marine ecosystems. He has also taken part in the MSC assessment of the South Georgia Patagonian Toothfish fishery and was part of the MSC Objections Panel for the New Zealand Hoki fishery.

## **APPENDIX D: STAKEHOLDER COMMENTS**



## ***MSC Fisheries Assessment: Barents Sea cod fishery***

### ***February, 2009***

The Barents Sea ecoregion is Europe's last relatively undisturbed marine ecosystem. Its' cold, but shallow waters teem with life, including huge stocks of cod, herring and capelin, as well as whales, polar bears, walrus and seals. Along its coasts, some of the world's largest seabird colonies gather in the spring and summer, and world-class salmon rivers run into the seas. The sea floor is home to rich benthic communities, including the world's largest known cold-water coral reef. Fish stocks in the Barents supply about half of all fish eaten in Europe. Shared by Russia and Norway, the biodiversity and biological productivity of the Barents region are of great importance for the economies of both countries. The changes in global climate and economic patterns draw international activities into the region, increasing pressure from existing resource exploitation, pollution and industrial activity and threatening to undermine biological diversity and production in the ecoregion.

#### **For further information contact:**

Nina Jensen  
Head of the Conservation  
Department  
WWF-Norway  
T: +47 99 16 96 94  
[njensen@wwf.no](mailto:njensen@wwf.no)

[www.wwf.no](http://www.wwf.no)

The Barents Sea ecoregion now stands at the critical crossroads which most other regions passed decades ago. While economic development will continue to drive the demands on the region's limited resources, we can still choose to move forward in a sustainable way. Certification of commercial fisheries is an important tool to ensure sustainability but only if all the key issues are addressed.

The cod population in the Barents Sea (North East Arctic Cod, ICES area I and II) is in good condition and the stock is classified by ICES as having full reproductive capacity and being harvested sustainably (ICES, ACFM 2008). WWF is of the opinion that North East Arctic Cod is a good candidate for MSC-evaluation, but we do have some concerns that need to be addressed for the potential certification of the fishery. The key issues are outlined below with some recommendations:

- **Trawling and coral reefs** – Cod is a groundfish, and a significant part of the fishery is done by bottom trawling. The Norwegian fishery uses sorting grids to avoid juvenile fish, and there is a coral regulation that bans bottom trawling in areas with known coral reefs. However, the question still remains if the present regulations are sufficient to protect vulnerable bottom habitats or if additional measures such as trawling free zones should be adopted.

Deep sea cold water coral communities serve as breeding, spawning and nursery areas for many fish species, and provide habitat for a variety of species. Research has also revealed that in sandy and muddy bottoms, biological communities exist that are just as unique and complex as their coral counterparts. Much is still unknown about the deep ocean, but we now know that extreme care must be taken if serious and irreparable damage to these slow growing and sensitive habitats is to be avoided. Bottom trawling can do irreversible damage not only to benthic ecosystems and habitats located along parts of continental shelves and associated deep canyons as well as seamounts and ocean ridge systems, but also to populations of the fish species targeted as well as to non-harvest species. Deep sea corals and other species tend to be long-lived and slow-growing, with some having been dated at 5,000–8,000 years old. A single pass of heavy trawling equipment can destroy such benthic structures, such as was found to be occurring in Norwegian waters prior to the trawling ban introduced in 2003. Coral regrowth can take hundreds of years. Even for soft bottom communities, the severe disruption can, in some cases, make it extremely difficult for recovery to their

previous habitat complexity and species composition.

*WWF believes that before the fishery can be certified there should be clear documentation that the fishery does not have negative impacts on the associated bottom habitats.*

- **Illegal, unregulated and unreported fishing (IUU)** – According to ICES, although the TAC regulations are in place, there is non-compliance, resulting in a significant amount of unreported landings. The main mechanism used in avoiding quota control seems to be transshipping of fish from the Barents Sea. There is an estimated significant reduction in IUU catches in 2007. Official estimates from Norwegian authorities state that the illegal fishery is reduced by more than 50 percent from 2005-2007, with an estimated illegal catch of 40 000 tons in 2007. This still consists around 8 % of the total catch, and the estimates might be lower than the reality.

**Total Allowable Catch** –The agreed management plan by the joint Russian-Norwegian Fisheries commission implies landings of 473 000 tons in 2009 (the harvest control rule implies a maximum 10% change in TAC from 2008). This projection includes all landings and therefore the TAC must account for all unreported landings. The agreed management plan has been found to be consistent with the precautionary approach and is therefore the basis for the advice for landings of 473 000 tons in 2009. However, the commission set the TAC for 2009 at 525 000 tons, increasing the TAC by 20 % and thereby not following the adopted management rule, which is an important

measure to ensure the long-term ecological and economical sustainability of the stock.

*WWF recommends that the MSC evaluation require to use the management plan as the basis for future TAC's, and that the estimated IUU catch must be accounted for.*

- **Bycatch** – The Barents Sea cod fishery is associated with bycatch of redfish, a species which is listed on the Norwegian red list as endangered. The stocks of redfish are at historically low levels, the last few year-classes have been small, and a further decrease in the stocks is expected. Redfish has had low and failing recruitment for decades, and the situation is not expected to change for a long time. The trawl fleet is currently allowed to take up to 15 percent redfish as bycatch. Redfish has late sexual maturity (around 14 years), grows slowly, and has a minimum population doubling time of 4.5 - 14 years, which makes it extremely vulnerable to overfishing. ICES recommended stronger regulations and has asked for a complete stop in all directed fisheries, increased conservation measures and stronger bycatch regulations for trawls. WWF believes that mandatory measures must be included to reduce redfish bycatch, and that bycatch limits for redfish must be set at an absolute minimum until a clear increase in the spawning stock and fish larvae recruitment can be confirmed.

In some areas at certain times of year, the Barents Sea fishery also has incidental catch of Norwegian coastal cod. The coastal cod is listed as endangered on the Norwegian red list of endangered species and its population is strongly reduced. ICES classifies the stock as not being harvested sustainably. The population has declined continuously since 1994 and the spawning stock is close to the lowest ever observed. ICES has recommended zero

catch of coastal cod since 2004. There is a management plan for the rebuilding of the coastal cod stock, and it is under continuous evaluation. So far we have not seen the necessary reductions of bycatch and little has been done to map and, if possible, reduce the catch of coastal cod by recreational fishers. New measures such as area closures have reduced the problem, but not sufficiently.

*WWF believes that measures must be taken to ensure bycatch (including target stock juvenile bycatch) does not threaten the populations of coastal cod and redfish and allows for recovery of the stocks. Such measures could be temporal and permanent area closures, protection of important spawning grounds, and reduced fishing effort in periods of high bycatch.*

- **Discards** – According to ICES, discarding of cod, haddock, and saithe is thought to be significant in some periods although discarding is illegal in Norway and Russia. Data on discarding are scarce, but attempts to obtain better quantification continue. There have been several estimations of discards in the Norwegian cod fishery.

In May 2004, the Norwegian “Discard commission” published a report on how to deal with discards in Norwegian waters. The report gives some important recommendations, which WWF supports, such as:

- *Keeping the ban on discard of commercial fish species*
- *Expanding the current system of closing areas with undersized fish*
- *Increasing the use of inspectors at sea*

- *More efficient control of fish vessels at sea*
- *More efficient control when landing fish*

- **Skewed age structure** - Historically, the Northeast Arctic cod has matured late, with a mean age at first spawning of about 10 years. However, the pattern of exploitation has changed drastically and the Northeast Arctic cod has undergone a change from a harvesting pattern that should favor late maturation to a pattern favoring early maturation. This hypothesis is in agreement with observations that show a clear trend towards earlier maturation of the Northeast Arctic cod, with a decrease of about three years in the mean age at first spawning from the 1940s until today. Eggs and larvae of first-time spawners are less viable than those of other mature fish and the overall spawning period is reduced when the spawning stock consists of fewer age groups because younger cod spawn for a shorter period than older cod. Literature warns that such fisheries-induced evolution can lead to lower yields and reduced stock stability.
- **Integrating Climate Change impacts into Ecosystem-based Management** – Air temperatures in the Arctic region have on average increased by about 5°C over the last 100 years. Arctic sea ice extent has decreased by 14% since the 1970s. Global climate change will continue to result in changes to the Arctic Ocean's temperature, acidity and sea ice coverage, with consequences on fish populations that are not yet well understood. Nonetheless, we know from observations of current patterns in the Arctic and other parts of the world that climate impacts can happen more quickly and at a greater scale than anticipated by models or scenarios.

*WWF believes that cod fisheries management needs to be adaptive and flexible in order to allow rapid adjustments as new information on the impacts of climate change becomes available. Failure to do so could mean that current management may prove to be inadequate as changes in seasonality, food availability, and migration result in changes in cod stocks that could not been foreseen under non-climate change scenarios.*

- **Expertise of the assessment team** - WWF remains concerned at the limited biological expertise in the assessment panel. Given the importance and significance of the Barents Sea ecosystem, it is difficult to comprehend why this expertise has been overlooked in the current assessment panel. While we recognize the competency of the panel, we believe the assessment team should include at least one scientist with significant biological expertise. WWF has previously offered names of possible suitable candidates who have considerable cod specific and fisheries expertise and has also provided names of possible independent peer reviewers. Bjarte Bogstad (Institute of Marine Research), Niels Daan (Wageningen Institute for Marine Resources and Ecosystem Studies), Andy Rosenberg (University of New Hampshire), Gudrun Marteinsdottir, (University of Iceland), and Gunnar Stefansson (University of Iceland).

*WWF urge that one of these experts be consulted in the evaluation of the suitability of this fishery for MSC-certification.*

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This briefing provides an overview of the issues and major areas of concern to WWF, further information and references are available if required.



**WWF International**  
 Avenue du Mont-Blanc  
 1196 Gland  
 Switzerland  
 Tel: +41 22 364 9111  
 Fax: +41 22 364 5829  
[www.panda.org](http://www.panda.org)

**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.



**DIRECTORATE OF FISHERIES**  
Resource Management  
Department

Moody Marine LTD  
Merlin House  
Stanier Way Wyern Business Park  
Derby DE21 6BF

Inquiries to: Modulf Overvik  
Telephone: +47 46804147  
Division: Utviklingsseksjonen  
Our reference: 10/2710  
Your reference:  
Our date: 23.02.2010  
Your date:

Att:

## **COMMENTS FROM THE DIRECTORATE OF FISHERIES ON THE DRAFT REPORT ON THE MSC ASSESSMENT OF THE NORTH EAST ARTIC COD**

We refer to your e-mail dated 20 January 2010.

In our opinion Moody Marine Ltd has produced a very comprehensive and thorough report, which covers important and significant aspects of the Norwegian codfishery. The presentation appears to be objective and unbiased.

In general the Directorate of Fisheries has no substantial comments or objections to the draft report, neither to the substance nor to the presentation. In our opinion, valid comments to the details in the different parts of the report are fully covered in the review reports from the two peers.

However, we would like to forward some comments on minor details about constitutional and factual issues in the report, comments that have no bearings on the conclusions of the draft report.

On page 13, the statement in the third section says: "Under the treaty terms between Norway and Russia, the NEA cod fishery is now managed by the Joint Norwegian – Russian Commission (JNRFC)". Fisheries in the international waters fall under the management auspices of the North East Atlantic Fishery Commission (NEAFC)"

It should be noted that the management of cod caught in international waters in the Barentz Sea falls under the auspices of JNRFC, not NEAFC.

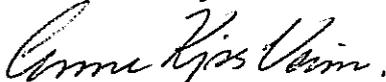
On page 14: "In 2005 the Norwegian Directorate of Fisheries, the body responsible for monitoring and enforcement of fishery related activity, estimated IUU fishing was 114.000t, i.e. >20% the reported landing figure. By 2007 the Norwegian Directorate of Fisheries was confident that IUU landings in 2007 were no more than 40 000t (<10%) and is optimistic that it will continue to decline".

We will here like to comment that the same method was used in calculating the IUU landings in 2007 as in 2005. For the years 2005 – 2009 the following estimates of IUU landings of cod have been calculated:

2005: 101 300t  
2006: 117 000t  
2007: 40 000t  
2008: 15 000t

On page 15, the statement that “In the early part of the year the trawl fleet tends to target saithe in the southern Norwegian waters (62° – 64° N)”, also includes areas further south in the North Sea, both in the Norwegian EEZ and in Community waters.

Yours sincerely

  
Anne Kjos Veim

  
Modulf Overvik

**APPENDIX E: REGISTERED COMPANIES / VESSELS WITHIN UNIT OF  
CERTIFICATION: ELIGIBLE TO SELL MSC CERTIFIED PRODUCT**

**Norwegian vessel register:**

**<http://www.fiskerdir.no/register/fartoyreg>**

## Appendix F. Stakeholder Comments on Draft Report

The comments received by stakeholders (WWF and MSC) are appended here. Responses to the points raised are provided below.

### 1. WWF

Issue raised by Stakeholder	IMM Response
<p>PI 2.1.1 Retained coastal cod bycatch. WWF identify several of the issues associated with rebuilding coastal cod, and ask what action will be required if rebuilding cannot be demonstrated.</p>	<p>The SG80 requirement for this PI requires ‘demonstrably effective’ management measures. The effectiveness of the coastal cod recovery plan has been demonstrated through simulation. At future surveillance audits, it would need to be shown that the recovery plan was being effectively implemented; we recognise that this is a long-term situation. In order for this fishery to be recertified at the end of the current period, the client would need to demonstrate either that rebuilding of coastal cod was taking place, or (if recovery was not apparent) that the measures applied to the fishery were not hindering recovery and rebuilding (recognising that environmental factors beyond fishery management may also be affecting the stock recovery).</p>
<p>PI 2.2.2. WWF raise concern over levels of discarding of commercial species.</p>	<p>The discarding of commercial (retained) species is actually a PI 2.1 issue. However, we note the Discard Commission report referenced by WWF and the recommendations therein. We would therefore review this document as part of the client’s actions to meet Condition 1.</p>
<p>PI 2.4.1. WWF question the score for this PI (75) as trawl and Danish seine impacts on sensitive habitats have not been quantified. Also, Condition 3 does not require an assessment of the potential impact of trawl fishing within known sensitive habitats.</p>	<p>For the reasons given in the scoring comments for PI 2.4.1, the assessment team considered that a score of 75 was applicable to trawl, Danish seine, longline and gill-net fisheries. We note that an incorrect score was identified for Danish Seine (although the correct score of 75 was used in the calculation of the score for Principle 2). This has now been rectified. The score of 75 was considered appropriate for these gear types. Given the overall performance of the fisheries against Principle 2, the outcome of the assessment would not be affected even if the score were lowered to 60.</p> <p>Condition 3 applied to each of the trawl, Danish seine, longline and gill-net fisheries. This has been clarified in the wording of the Condition.</p>
<p>PI 1.2.3. WWF highlight the need for adaptive and flexible fishery management to cope with environmental change, particularly climate change.</p>	<p>This is an issue of maintaining sufficient information on changes in the environment to allow adaptive management of both the target stock, and the ecosystem in general. This falls under PI 1.2.3 for the target stock and 2.5.3 for the ecosystem. The assessment team considered information gathering to be sufficiently strong in both respects (PI 1.2.3 scored 85, although aspects regarding environmental information scored 100 and 2.5.3 scored 90). Maintenance of such data series will be critical, and will be monitored in future surveillance audits.</p>

### 2. MSC

Issue raised by Stakeholder	IMM Response
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Insert scoring summary table	Inserted for all gears types
Include scoring indicators for Conditions.	This was included for the PCDR and now the Final Report, but not in the client action plan.
Responses to stakeholder submissions (Appendix D)	Because of the phasing of this project, the stakeholder submissions in Appendix D (WWF and Fishery Directorate) were received and addressed before TAB-D-029 was produced. The responses to these comments are integrated into the report for offshore cod and haddock – which then formed the basis of this inshore fishery report (see Section 11). Further stakeholder submissions (and WWF kindly responded again), and our responses thereto, are included in Appendix F.
Requirement for statement on harmonisation (with Norwegian offshore fisheries and Barents Sea cod fishery)	The first fishery targeting these stocks to be certified was the Moody Marine assessment of the Norwegian offshore cod and haddock fisheries. The subsequent FCI assessment of the ‘Barents Sea cod’ fishery (Russian and Norwegian) harmonised with this original Norwegian assessment. The current Norwegian Inshore fisheries assessment is based on (and so also harmonised with) the offshore fishery, the only differences being specific differences associated with fishing in inshore waters, particularly the coastal cod bycatch. All fisheries are therefore harmonised with the original assessment (Norwegian offshore cod and haddock). This is included in the report.
Clarification of points of landing.	Further information is provided in the text.
Rationale for target eligibility date (TED).	The fishery has no seasonality, and so the TED is set at 6 months prior to the release of the PCD Report. Recording of landings is well monitored in Norway and most Norwegian processing and trading companies already have Chain of Custody certification; traceability systems are therefore well established.
Tracking of product during onboard processing.	The report describes that product is clearly labelled following on-board processing. Together with the contract note, this ensures traceability.
Link in Appendix E	Raised with client to fix.
Scores for separate UoC	Unless specified, scores are common for all UoC’s. This is clarified in the text.
Guidance points have been addressed in the report where appropriate.	



**WWF-Norway**  
P. O. Box 6784 - St. Olavs plass  
N - 0130 Oslo, Norway

Org.no.: 952330071  
Tel: +47 22 036 500  
Fax: +47 22 200 666  
wwf@wwf.no  
[www.wwf.no](http://www.wwf.no)  
[facebook.com/WWFNorge](https://facebook.com/WWFNorge)

Andrew Hough  
Intertek Moody Marine  
Merlin House  
Stanier Way  
Wyvern Business Park  
Derby, DE21 6BF  
United Kingdom

September 2, 2011

**Ref: WWF COMMENTS TO THE PUBLIC COMMENT DRAFT REPORT FOR THE  
NORWEGIAN NORTH EAST ARCTIC INSHORE COD FISHERY**

Dear Mr Hough,

The cod population in the Barents Sea (North East Arctic Cod, ICES area I and II) is in good condition and the stock is classified by ICES as having full reproductive capacity and being harvested sustainably (ICES, ACFM 2008). WWF supported the MSC-certification of North East Arctic offshore cod, but we do have some concerns that need to be addressed for the potential certification of the North East Arctic inshore cod fishery.

WWF has carefully considered the draft assessment report. We acknowledge that the PCDR identifies a number of conditions which, if met, will improve the fishery over time. While MSC is the most rigorous standard for sustainable fishing, WWF is concerned about the coastal cod bycatch and the management plan for rebuilding the coastal cod stock.

The following section outlines WWF's concerns and questions regarding the draft assessment.

### **2.1.1 Retained Species Status**

*Main retained species are likely to be within biologically based limits, or if outside the limits there are measures in place that are expected to ensure the fishery does not hinder recovery and rebuilding of the depleted species.*

Score: 70

Coastal cod is listed as an endangered species on the 2006 Norwegian red list and ICES has classified the stock as depleted. The population was declining from 1994 to 2003 and has stagnated since. The 2010 spawning stock is the lowest ever observed, and is not expected to increase.

Both peer reviewers have raised significant issues of concern with respect to coastal cod bycatch and the management plan for rebuilding the coastal cod stock:

- No reliable reference points available at the time of the assessment
- No biologically founded rebuilding target, no information on where the stock currently lies in relation to this target
- Monitoring of, and reporting on, rebuilding progress in absence of reference points and rebuilding target
- No action plan if rebuilding cannot be demonstrated
- Management measures are not demonstrably effective (effectiveness only indicated by ICES' simulations)
- No in-season ability to respond to hotspots of coastal cod bycatch (due to post hoc estimations of coastal cod bycatch)
- The NE Arctic inshore cod fishery is a large fishery - even low bycatch rates can constitute a high mortality rate for a depleted stock
- Questionable level of ambition of the coastal cod protection plan: '*minimising coastal cod catches as far as is practically possible*'
- Long rebuilding period

The assessment team acknowledges that bycatch of the depleted coastal cod is a key concern and raised a condition to ensure the fishery does not hinder recovery and rebuilding of any population outside biological limits.

However, WWF is concerned that condition 1 is not rigorous enough to achieve rebuilding of the depleted stock within 5 years. Peer Reviewer B states: Insufficient information is presented in the report to demonstrate how the status of this stock complex is assessed and whether adequate biological reference points (against which to evaluate stock status) can be developed.

Condition 1 requires that the rebuilding progress (of coastal cod) will be monitored and reported at subsequent annual MSC surveillance audits, but it is not clear what action is required if rebuilding (or a stock status that is within biologically based limits) cannot be demonstrated. The Client Action Plan has to adequately address this.

### **2.2.2 Bycatch Species Management Strategy**

*There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder recovery.*

Score: 95

According to ICES (ICES AFWG Report 2009) discarding of cod and haddock (and in some years also saithe) is thought to be significant in periods, although discarding of these, and a number of other species, is illegal in Norway and Russia.

The assessment team has attributed high scores to the bycatch performance indicators (100, 95, 80) while discards can be significant. Data on discarding is scarce, but attempts to obtain better quantification needs to continue.

In May 2004, the Norwegian 'Discard commission' published a report on how to deal with discards in Norwegian waters. The report gives some important recommendations, which should be part of the bycatch management strategy of the NE Arctic inshore cod fishery:

- Keeping the ban on discard of commercial fish species
- Expanding the current system of closing areas with undersized fish
- Increasing the use of inspectors at sea
- More efficient control of fish vessels at sea
- More efficient control when landing fish

### **2.4.1 Habitat Status**

*The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm*

Score: 75

Demersal trawling has a significant impact on seabed structure and the abundance of cold-water corals. The total impact of trawl and Danish seine activities, requiring an extensive mapping of fishing effort and bottom habitat across the North East Arctic region, has not yet been assessed.

Given that demersal impacts relative to habitat distribution have not been mapped and impacts on (sensitive) habitats are likely to be significant, a score of 75 seems unjustified for the trawl and Danish seine components of the fishery.

Condition 3 does not include an assessment of the potential impact of trawl fishing within known sensitive habitats, while the trawl component scores below 80.

### 1.2.3 Harvest Strategy Information / Monitoring

*A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as **environmental information**), including some that may not be directly relevant to the current harvest strategy, is available.*

Air temperatures in the Arctic region have on average increased by about 5°C over the last 100 years. Arctic sea ice extent has decreased by 14% since the 1970s. Global climate change will continue to result in changes to the Arctic Ocean's temperature, acidity and sea ice coverage, with consequences on fish populations that are not yet well understood. Nonetheless, we know from observations of current patterns in the Arctic and other parts of the world that climate impacts can happen more quickly and at a greater scale than anticipated by models or scenarios

WWF believes that cod fisheries management needs to be adaptive and flexible in order to allow rapid adjustments as new information on the impacts of climate change becomes available. Failure to do so could mean that current management may prove to be inadequate as changes in seasonality, food availability, and migration result in changes in cod stocks that could not be foreseen under non-climate change scenarios.

Thank you for the opportunity to provide comments to the draft assessment report.



Karoline Andaur  
Head of the Marine Programme

WWF Norway  
Postboks 6784  
St Olavs plass  
0130 Oslo  
[kandaur@wwf.no](mailto:kandaur@wwf.no)  
+47 93 22 47 90



Alfred Schumm  
Director SFI

Smart Fishing Initiative  
(Global Fisheries Programme)  
Hongkong Str. 7  
20457 Hamburg  
[alfred.schumm@wwf.de](mailto:alfred.schumm@wwf.de)  
+49 40 530 200-130

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Sent via eCert



Marine House  
 1 Snow Hill  
 London EC1A 2DH  
 United Kingdom  
 Tel: +44 (0)20 7246 8900  
 Fax: +44 (0)20 7246 8901

**SUBJECT: MSC Review and Report on Compliance with the scheme requirements**

Dear Andrew Hough:

Please find below the results of our partial review of compliance with scheme requirements.

CB	Intertek Moody Marine
Lead Auditor	Andrew Hough
Fishery	Norway North East Arctic inshore haddock
Fishery Assessment Product Type	Public Comment Draft Report Posted
Type of Review	Desk Study

No.	Type of Finding	Scheme Requirement		Requirement Description	Report Reference	Description and Evidence of non-conformity
1	Major	FCMv6	Appendix 1: 5.2	...this methodology the report shall describe the system of tracking and tracing of fish and fish products in the fishery	Page 68	The traceability section does not describe how traceability is maintained within the fishery.
2	Major	TAB	D-021	4. The fishery CB shall document their rationale for the date specified...	Page 68	No rationale provided to justify the eligibility date.

3	Major	PA	5v2	The report shall set out the scope of the fishery assessment in the context of the assurances the certification body can make about the point to which products from the fishery can be traced and describe known risk factors prior to or after the point of first landing that may influence subsequent chain of custody assessments	Page 68	The point of landing is not specified. The report says: "Prescribed points of landing are designated Norwegian landing points." More info on this is needed as it does not clearly allow to map the chain of custody further down the line. If this information is elsewhere in the report a reference to that part of the report must be made.
4	Major	FAMv2.1	4.1.1	"CBs shall use the MSC supplied scoring spreadsheet as the basis for reporting assessment results."		No summary scoring table showing scores for each UoC is provided.
5	Major	TAB	D-033: 3.4.2	"...the CB shall set one or more conditions for continuing certification against each performance indicator."	Pages 149, 150, and 151	"Relevant Scoring Indicators" not filled in for each condition.
6	Major	TAB	D-029: 9	The PCDR shall include "c. explicit responses from the assessment team to [stakeholder] submissions..."	Appendix D	No responses to the two stakeholder submissions have been included.

7	Major	TAB	D-015 v2: 2.4	"Where a fishery assessment overlaps with a certified fishery or fishery in assessment that has already been scored, the assessment team shall base their assessment on the rationale and scores detailed for the previously scored fishery. Any difference in the scores shall be clearly detailed and justified in the scoring rationale for all relevant performance indicators."		P1 and P3 scores and conditions should be harmonised with certified fisheries or with fisheries in assessment that are on 'overlapping stocks' where the scores were available prior to the submission of this fishery's PCDR. No statement is provided on which fisheries are regarded as needing harmonisation, nor on the rationale for the differences in scores. Overlapping fisheries are assumed to include: Barents Sea haddock Norway North East Arctic offshore haddock
8	Major	FCMv6	Appendix 1: 5.2	The report shall set out the scope of the fishery assessment in the context of the assurances the certification body can make about the point to which products from the fishery can be traced	Page 68	The report provides a list of eligible vessels in Appendix E, but the link does not work.
9	Major	FAMv2.1	4.2.1	UoC is defined as "the fishery or fish stock...combined with the fishing method/gear...that is the subject of certification."		For most of the PIs, the report does not score each UoC separately. Section 4.2 of the FAM outlines how to score each UoC. Since each UoC is subject to a separate certification, each should be scored separately.
10	Guidance					Page numbers throughout the report would be useful.
11	Guidance				Page 84	Score of 90 does not match "hence a score of 95" below it. Clarification needed.
12	Guidance				Page 89	The report does not state whether or not the score of 70 is for each of the UoCs.
13	Guidance				Pages 149, 150, and 151	The report does not state which UoCs are relevant for each condition.

14	Guidance				"Assessment Results" pages	UoCs labelled as "Norwegian North East Arctic Offshore Haddock" when it should say "Inshore".
15	Guidance	TAB	D-030		Page 68	This section does not state how bycatch is kept separate from the stock under assessment nor does it state that bycatch is not eligible to enter chains of custody.
16	Guidance	FCMv6	3.5.1	...clearly state within its certification report that the fish and fish products from the fishery may enter into further chains of custody, and be eligible to carry the MSC logo...	Page 67	Although in the traceability section it makes reference to the product being eligible to enter into Chains of Custody it does not specifically reference it being eligible to carry the MSC logo.

This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Jodi Bostrom on +44 (0)20 7246 8934 for more information.

Best regards,



Maylynn Nunn

Senior Fisheries Certification Manager  
Marine Stewardship Council

cc: Accreditation Services International